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BUILDING AGE

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CAMBRIDGE

VOL. XXXV.—1913

NEW YORK
DAVID WILLIAMS COMPANY *d.*
239 WEST 39TH STREET

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THE BUILDING AGE

NEW YORK, JANUARY, 1913

AN INEXPENSIVE BRICK HOUSE IN DENVER

How the Architect Planned to Meet the Specific Requirements—
Details of Construction—Heating by Warm-Air Furnace

A PLEASING variation from the designs of cement-coated, frame and concrete buildings which have been features of this journal in the recent past, is the inexpensive brick dwelling which constitutes the basis of the present article. In the city where it was erected brick houses predominate in the residential

to be used as a library. There should be sliding doors between the living room and the dining-room.

"In the second story I want three bedrooms, each with a closet, and a bath room with modern plumbing.

"I think it will be best to have a cellar under the entire building, to provide for a warm air furnace, coal



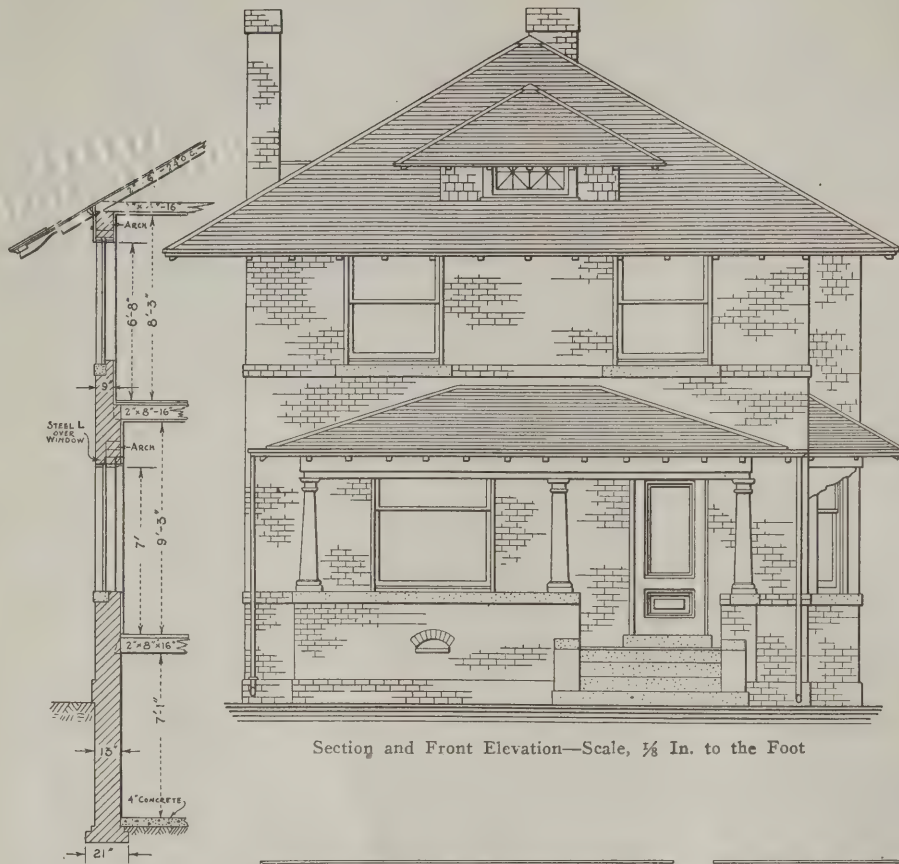
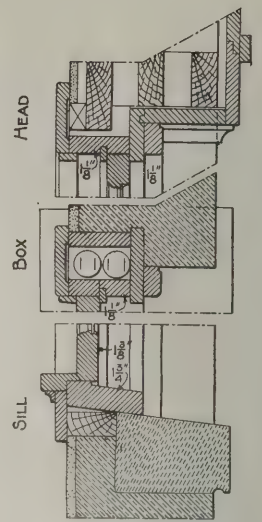
An Inexpensive Brick House in Denver—Front, Rear and Street Views—Architect Frank J. Grodavent, Cheyenne, Wyoming

sections and what is here presented may be taken as a typical example. The house was designed for a family of five, and when the order for the plans was placed with the architect the lady of the house stated the requirements to be about as follows:

"I want a small brick house with two full stories in height, a living-room about 14 ft. square with fireplace and mantel, a medium sized dining room with plate rail, a small kitchen and a good sized pantry. I do not care for a large hall with stairs and waste room, but would like a small entrance and if possible a little room

store room, laundry and a dark room for canned fruits, etc. In the laundry I would like a slop sink, as we will omit the laundry tubs at present. I would like a nice front porch and outside cellar entrance. Everything should be plain to keep down the cost."

The size finally settled upon for the house was 24 x 30 ft. with a height of 9 ft. for the first story and 8 ft. for the second story; a height of 7 ft. for first story openings and 6 ft. 8 in. for the second story openings which permitted the finish of head casings at the openings to finish on the same line.

Section and Front Elevation—Scale, $\frac{1}{8}$ In. to the Foot

Details of Second-Story Box Window Frames—Scale, 1 In. to the Foot

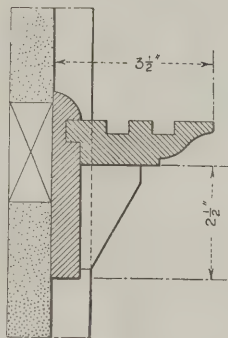
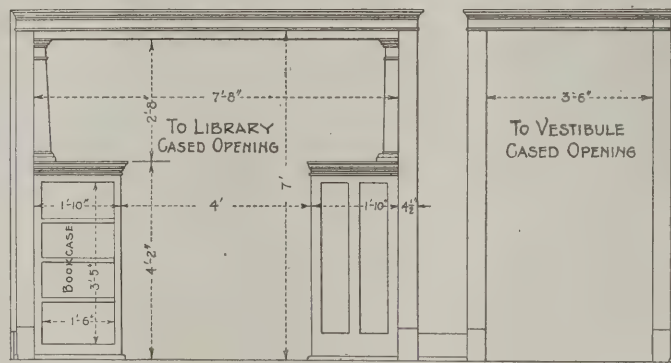
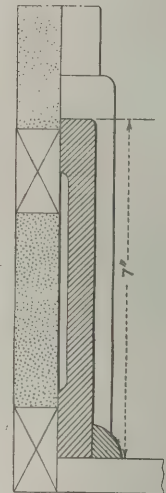
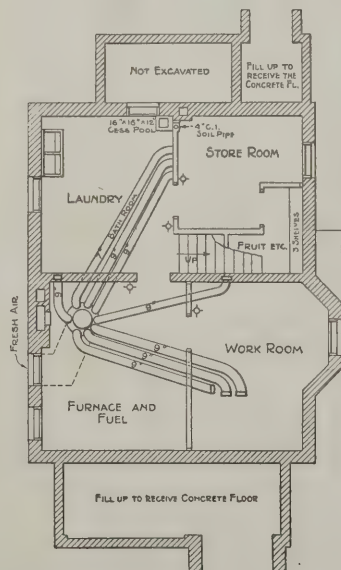
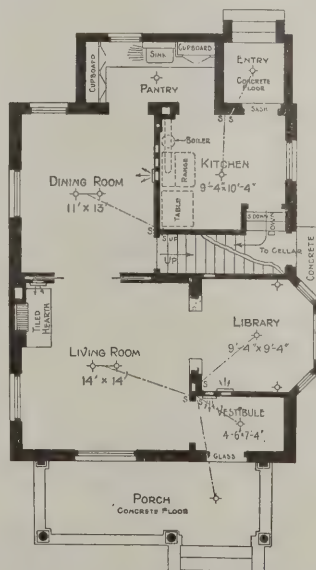
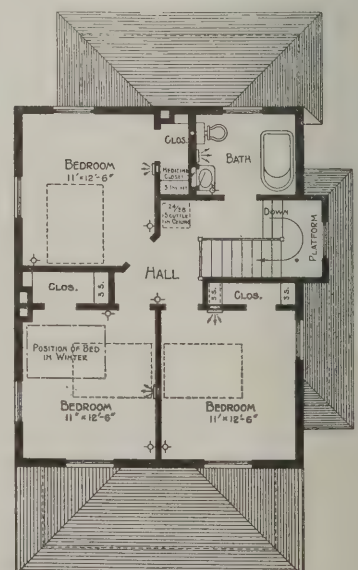


Plate Rail—Scale, 3 In. to the Foot

Details of Cased Opening Between Living-Room and Library and Vestibule—Scale, $\frac{1}{4}$ In. to the Foot

Detail of Base—Scale, 3 In. to the Foot

Cellar and Foundation Plan—Scale, $\frac{1}{16}$ In. to the FootFirst Floor Plan—Scale, $\frac{1}{16}$ In. to the FootSecond Floor Plan—Scale, $\frac{1}{16}$ In. to the Foot

The half-tone engravings presented upon this and the pages which follow clearly indicate the appearance of the completed dwelling both as it appears from the front and also from the rear. In the street scene the house under discussion is shown at the extreme left. The plans clearly indicate the general arrangement

and shingled over these flashings. All exposed rafter ends are dressed and worked in accordance with the details. No gutters are provided, the water discharging from the heavy projections to the ground.

The first and second floor joists are 2 x 8 in.; the stair platform joists are 2 x 6 in., as are also the attic or ceiling posts, and all are placed 16 in. on centers. The rafters of the main roof are 2 x 6 in., placed 24 in. on centers; the hip rafters are 2 x 8 in.; the rafters of the rear wing porch, bay and dormer are 2 x 4 in., placed 24 in. on centers, and the hips are 2 x 6 in. The stud-ding for the partitions is 2 x 4 in., placed 16 in. on centers and is doubled at doors and openings. The plates on the brick walls consist of a 2 x 8 and a 1 x 8 spiked and bolted together. The joists have 4½ in. wall bearing and the ends are cut on a splay to allow them to drop out in case of fire without injury to the walls. The stud partitions joining brick walls have the stud secured to the brick work with ½ in. bolts.

The cellar has a concrete floor 3 in. thick, the base being 2 in. thick and composed of one part Portland cement, 3 parts sand and 5 parts clean gravel. The one inch top finish is composed of one part cement and two parts sand.

The porch floors have a total thickness of 6 in., the base being 5 in. thick and composed of one part Portland cement, 3 parts sand and 5 parts gravel. The one inch top is composed of one part cement and two parts sand. The treads of the steps are finished with a top dressing one inch thick of the mixture described and the

of the rooms, while the numerous details show the style of trim and the features of construction.

The footings are of brick. The basement and first story walls are of brick 13 in. thick, while the second story walls are of brick and 9 in. thick. The bricks are all laid in white lime mortar. The exposed outside walls and chimneys are faced with dark red pressed brick with rodded joints. The square head openings in the first story brick walls are supported upon steel angles with the brickwork carried across in regular bond. The openings in the second story have row-lock arches behind the wood frieze of the cornice.

Across the entire front is a covered porch with Standard turned columns having square base and abacus. The entrance steps and porch floor are of concrete with stone capped brick buttresses at steps and stone capped brick walls enclosing the porch. The rear entrance steps and floor of the entry are of concrete similar to those at the front porch.

The roofs, sides of dormers and projections at second story hall are covered with tongued and grooved fir boards about 8 in. wide, over which is placed a medium weight of red roofing paper with "Star A Star" cedar shingles laid 4½ in. to the weather on the roofs and 5 in. to the weather on the vertical surfaces. The shingles on the front porch roof are secured to 1 x 4 in. strips spaced for the shingles and without paper. Where the shingles of the roof join the vertical walls tin flashings were shingled in with each course as the shingles were laid, while the shingles on the vertical surfaces were put on afterward



An Inexpensive Brick House in Denver—View in Dining Room Looking Toward the Living Room

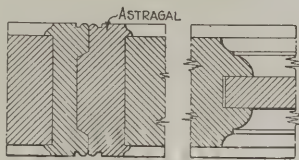


View in Living Room, Showing Mantel and with Dining Room to the Right

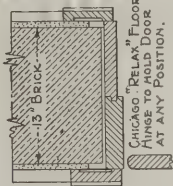
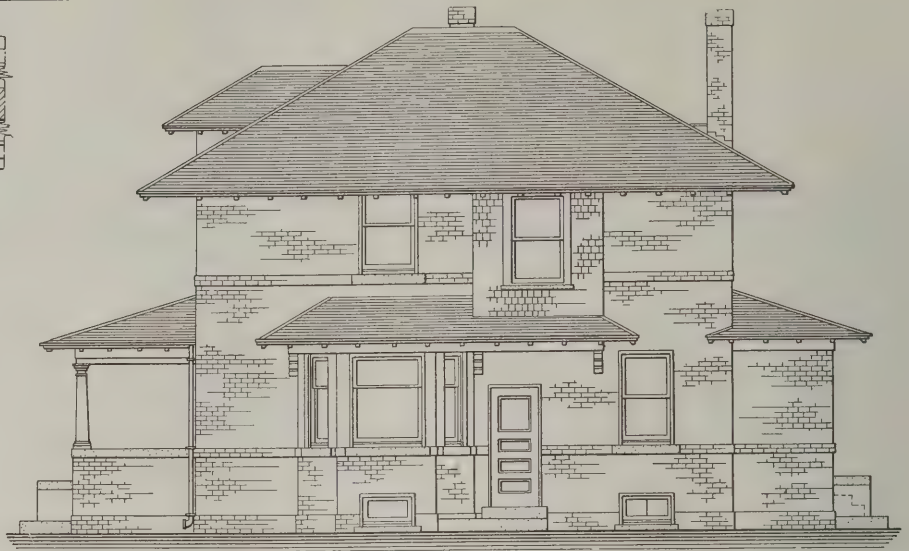
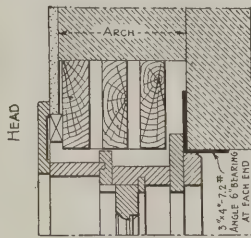
risers have a similar dressing of cement ½ in. thick.

The brick foundation walls enclosing the cellar are plastered below grade with ½ in. mortar similar to that used in laying the foundation walls; namely, one part fresh burned lime with 4 parts sand and tempered as used with one part cement to 5 parts mortar.

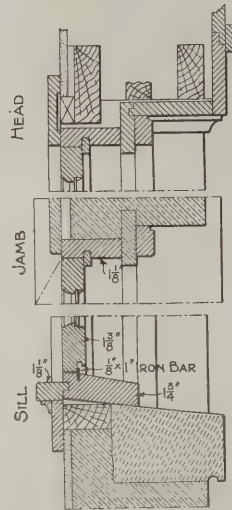
The inside walls and ceilings of the house are plas-



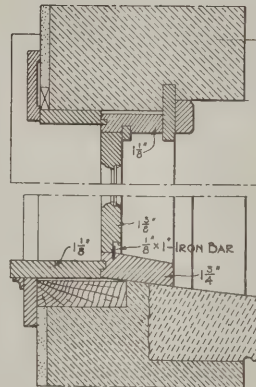
Detail of Sliding Doors

Detail of Double Swing Door—Scale, $\frac{3}{4}$ In. to the Foot.Side (Right) Elevation—Scale, $\frac{3}{32}$ In. to the Foot

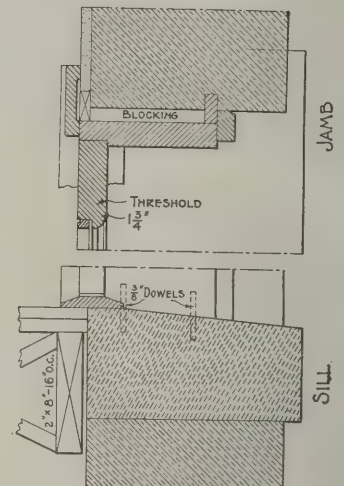
Details of First Story Box Window Frames—Scale, 1 In. to the Foot



Details of Second Story Casement Window Frames—Scale, 1 In. to the Foot



Details of First Story Casement Window Frames—Scale, 1 In. to the Foot



Details of Front Door Sill and Jamb—Scale, 1 In. to the Foot

Rear Elevation—Scale, $\frac{1}{8}$ In. to the FootPartial Elevation of Sliding Doors—Scale, $\frac{1}{4}$ In. to the Foot

tered with "Buckhorn" hard wall plaster put on in two coats of "Drawn" or "Doubled-Up Work," using one part of fibred plaster to 3 parts sand, and after being thoroughly dry finished with a white coat of plaster of Paris mixed with lime putty. All angles are protected with metal corners of recognized merit.

The front entrance is provided with an oak door having plate glass panel. The upper sash in the parlor, library and dining room are glazed with stained and leaded glass. All sash in double windows are hung with cords and weights on axle pulleys.

Double floors are used throughout the house, the under floor being common stock of 1 x 8 in. fir, with square edge laid diagonally, over which was placed a good weight of carpet paper, and this in turn covered with $\frac{7}{8}$ x 3 in. quarter sawed fir flooring.

All inside trim is in hard pine, finished natural. The main rooms on the first story have picture molding.

An inspection of the plans will show how well the architect worked out the design from the instructions, giving all the rooms mentioned, the front entrance, the living room with its oak mantel and fireplace, tile facings and hearth with ash chute to discharge the ashes into the ash pit in the basement; the little library with its bay separated from the living room with a wide opening having broad shelf at either side showing panels of wood in the living room and book cases in the library; the dining room with its plate rail, broad side window and narrow window at end with space between it and the pantry door for

rendering it necessary to pass through the front.

The kitchen is small but meets all requirements as the commodious pantry contains all necessary cupboards and a white enameled sink conveniently placed to the dining room and kitchen, while the arrangement avoids direct communication between the two rooms. The



Corner of Library and Entrance to Vestibule as Viewed from Living Room



An Inexpensive Brick House in Denver—Looking Into the Library from the Living Room

the sideboard, while the space between windows has been utilized for a neat little oak serving table which the owner found time to make. There are sliding doors between the living room and the dining room which when closed separate the working portion of the house from the front part, while at the same time permitting communication to the second story without in any way

back entrance to the kitchen forms a small covered way, and with the pantry is under the same roof. From the kitchen, stairs lead down to a grade entrance platform, thence to the cellar, where the front portion is separated from the rear by a brick wall and is partitioned into two rooms, one being utilized for the furnace and coal and the other for a store and work room, while the rear portion of the cellar is divided into laundry, store room and dark closet for canned goods. The cellar stairs starting from the laundry are convenient for the laundry, furnace room and for outdoor service without passing through the kitchen.

A feature in connection with the stairs is that no winders are used and each flight has a platform. It will be noticed that the main flight of stairs to the second story is boxed to the landing platform and then left open and the open stairs well protected with a railing.

Referring to the dimensions on the second floor plan it will be noticed that the three bedrooms are of the same size and each is provided with a closet and two windows. The bath room is larger than usually found in similar houses of like dimensions; enameled open plumbing fixtures are used; the water closet has low down tank and is of

vitreous earthenware. The bath tub, lavatory and pantry sink are cast iron, white enameled, and the sink is provided with white enameled back. The tub was made by the Standard Mfg. Company, Pittsburgh, Pa., and the plumbing fixtures were supplied by the M. J. O'Fallon Supply Company, Denver, Col. A medicine cabinet with plate mirror is placed over the lavatory. While

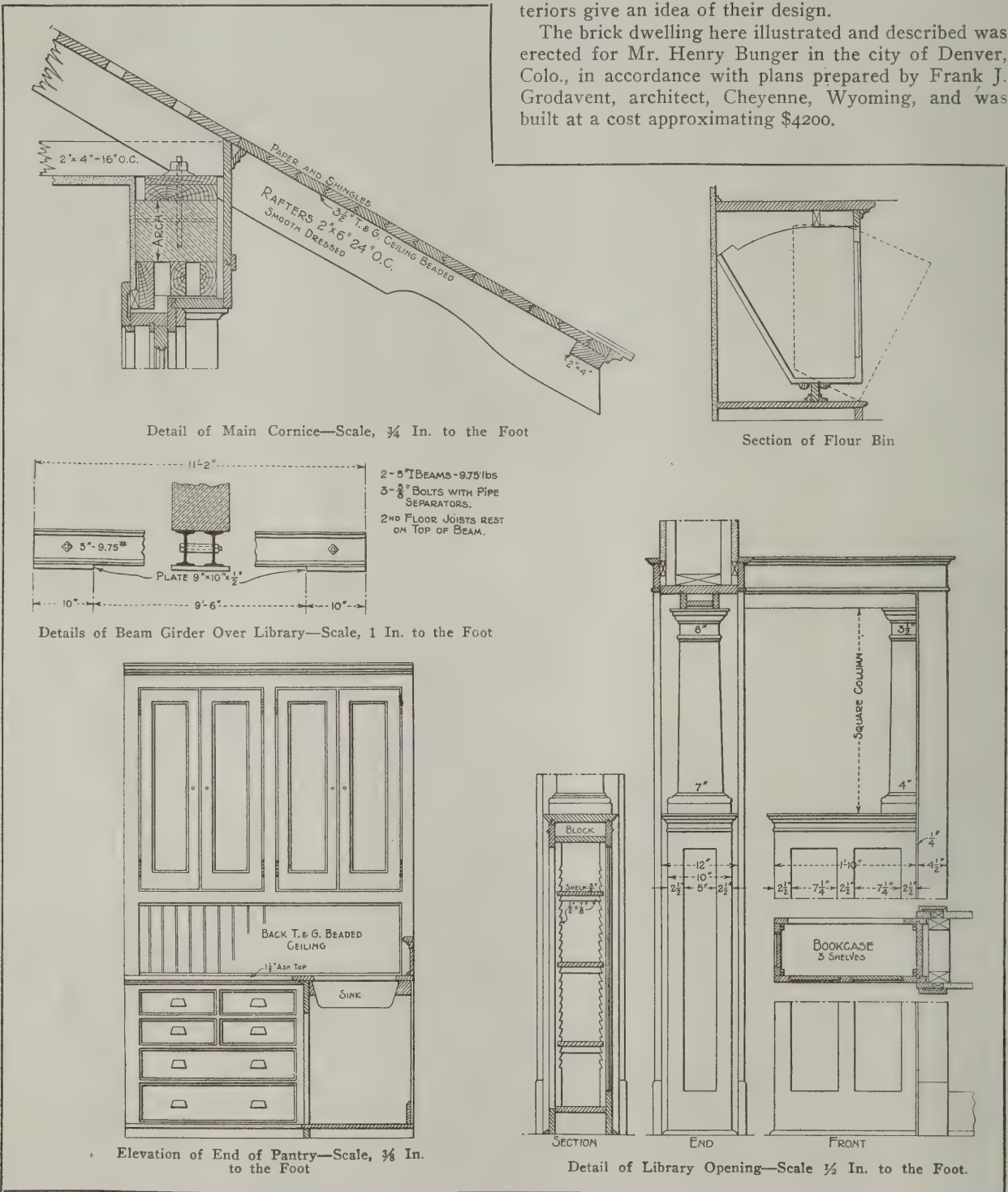
laundry tubs were not installed at the completion of the house provision has been made for their location in the basement laundry. A bell floor trap is placed in this room.

The house is heated by an "American" Steel Warm Air furnace, No. 342, made by the American Furnace Company, 2725 Morgan Street, St. Louis, Mo. There

was installed by the Michal Heating Company, Denver, Colo., at a cost of \$135.

The house is lighted by electricity—ceiling and bracket lights being used in the first story with side wall switches as shown for ceiling lights only. The second story and basement are lighted with side wall brackets. All light fixtures are plain and finished in brushed bronze. The photographs representing the various interiors give an idea of their design.

The brick dwelling here illustrated and described was erected for Mr. Henry Bunker in the city of Denver, Colo., in accordance with plans prepared by Frank J. Grodavent, architect, Cheyenne, Wyoming, and was built at a cost approximating \$4200.



An Inexpensive Brick House in Denver—Miscellaneous Constructive Details

are separate warm air pipes leading to special base registers, all pipes being 9 in. in diameter except the one leading to the bath room, which is 7 in. in diameter. The furnace supplies 8 registers and has a fresh air supply taken from outside at one of the furnace room windows. In all cases the leader pipes from the heater are made of bright tin and covered with asbestos paper. For the past three winters the furnace has given entire satisfaction in the coldest weather. The heating plant

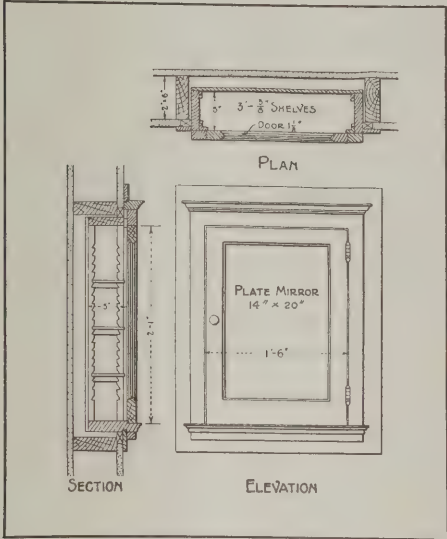
With slight modifications the house under the same plan, the architect states, could be built today for about \$3800 if contracted for in Denver, and for less money if built of wood in a locality where the cost of lumber or bricks is much less than in that city.

Hazard, Erskine & Blagden, architects, have planned a 16-story loft building from 29 to 33 West 38th street, New York, to cost \$275,000.

Ancient Reinforced Concrete in Paris

A strange discovery lately made in the walls of the old palace of the Louvre shows that reinforced concrete was by no means unknown in Paris as far back as the XVIth century, when the rebuilding of the Louvre was undertaken by that industrious builder, Francis I. The *Figaro* states that when executing works in connection with the application of a modern

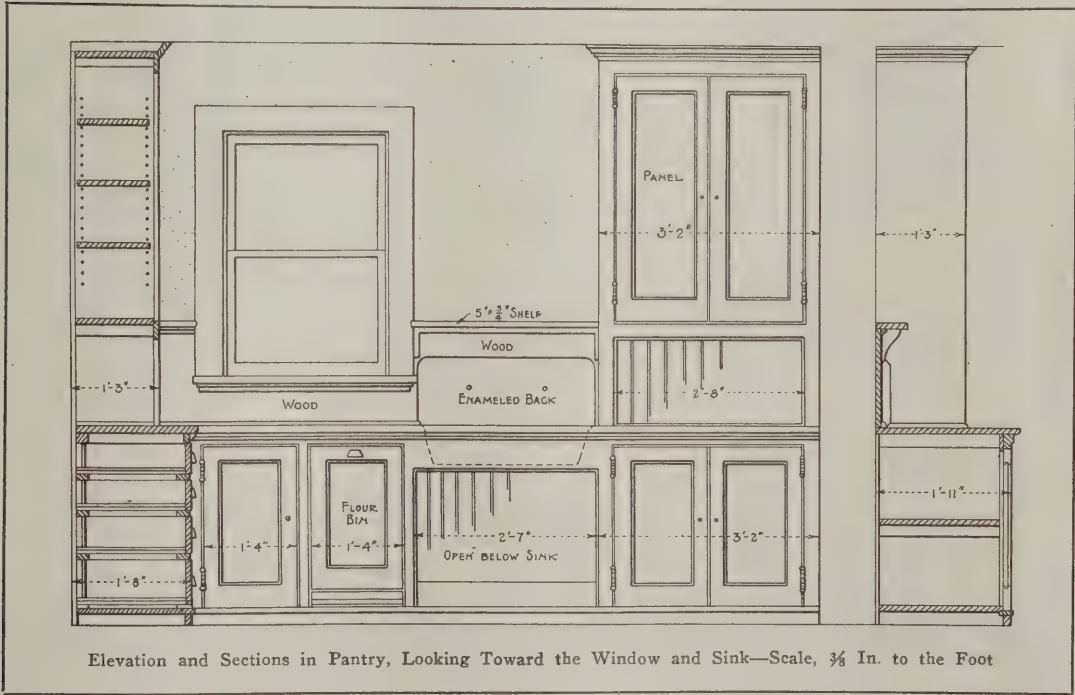
interesting. The authority in question states that some one with archaeological tastes has taken the trouble to search the archives for records left by the architects of the epoch in question, with the result that no mention was found of anything but dressed stone for use in the walls. It seems, therefore, that the contractors, with more wisdom than honesty, decided to make sure of reaping the benefit attending the adoption of reinforced concrete as a substitute for stone masonry.



Plan, Elevation and Section of Medicine Closet in Bath Room—Scale 1/2 In to the Foot



View from the Living-Room Looking into the Dining-Room



Elevation and Sections in Pantry, Looking Toward the Window and Sink—Scale, 3/8 In. to the Foot

An Inexpensive Brick House in Denver—Miscellaneous Constructive Details

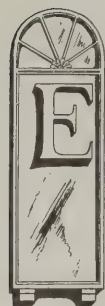
lift the workmen employed found it necessary to cut through some of the old walls, which were apparently of dressed masonry. But, to the surprise of the contractors, it was found that the stone was nothing but the outer shell of construction largely composed of a kind of reinforced concrete. In view of the generally entertained belief that this is an essentially modern variety of structural material, the proof of its employment between 300 and 400 years ago is distinctly

Vancouver, B. C., is erecting a ten-story reinforced concrete apartment house to cost \$600,000. The building is faced with cut stone, pressed brick and terra cotta, and finished inside with hardwood and marble vestibules and corridors. Its mechanical equipment will include an oil-burning steam-heating plant. The architect is W. M. Dodd, 924 Hastings street West, Vancouver, B. C., who is also architect for the six-story apartment house to cost \$200,000.

CABINET WORK FOR THE CARPENTER—II.

Certain Bedroom Furniture—Toilet Conveniences—The Modern Dressing Table—The Shaving Stand—The Wash Stand

By PAUL D. OTTER



EVERYTHING which adds to our comfort—assisting in our daily process of refinement—is certainly to be welcomed and the few bedroom accessories which are here to be considered in addition to some dealt with in the last issue of the *Building Age* should not be considered as more of vanity's machinery, but rather as furniture forms for the bedroom which meet the needs of the more modern exaction of the toilet. Our conventionalities more than ever require the wife and daughter to look their best if not their prettiest, and the dressing or toilet table is the lady's work bench. Shaving among men is a daily matter of toilet and a compact and convenient place for shaving articles soon creates a demand for a place other than the window sill or medicine cabinet. The open character of the present-day furniture appeals to the orderly sense of the housewife, as it has recently from a cleanly reason appealed to the office man in

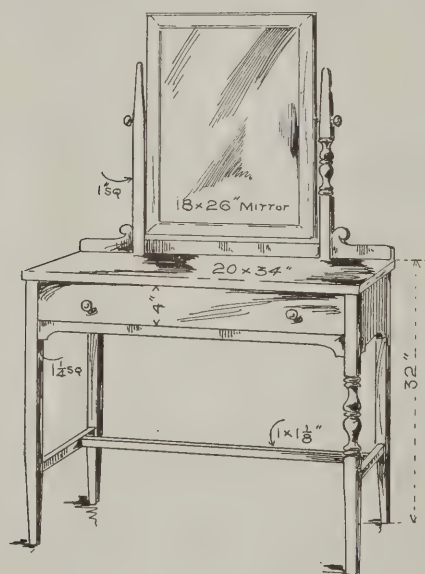


Fig. 1—General View of Toilet Table



Fig. 2—A Toilet Table or Dresser and Its Low Back Chair

Cabinet Work for the Carpenter

the introduction of the so-called "sanitary desk" and other large articles of furniture which formerly were the means of harboring so much dust under the low-built structure.

It will be noticed that the dressing tables shown in Figs. 1 and 2 are quite approachable affairs from their open character, and greater comfort and deliberation are to be given the hair dressing and other toilet operations by the use of the type of chair shown in front of the table in Fig. 2, which is distinguished from other chairs by the low back and different height of seat.

To the carpenter the construction of the articles shown in Figs. 1 and 2 is obviously apparent and it is only necessary to call attention again as in former articles to the almost invariable use of what will here-

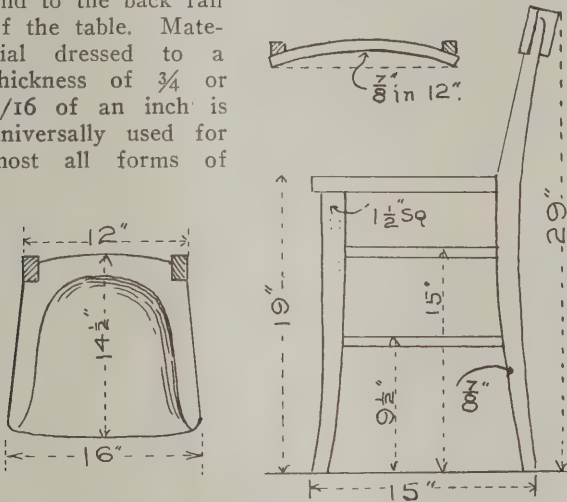
after be referred to as a "construction frame" illustrated in Fig. 3. The outer size of this is determined on the detail drawing, for be it known that the carpenter should lay out some sort of drawing showing at least half of the length and width of the article. In this case the plan is determined by the size of the top, which is 20 x 34 in. Now in the drawing 20 x 17 in. is sufficient to put in all needed detail of half the construction for purposes of location of posts, which in this and usual cases should set in $\frac{3}{8}$ to $\frac{3}{4}$ in. Then proceed to draw in on the half plan the position of the $\frac{3}{4}$ -in. side and back rails, together with the drawer front, which is also $\frac{3}{4}$ in. thick. The rails should set in from the face of the posts $\frac{1}{8}$ of an inch.

Having made this part of the plan, it will be easy to draw in this structural detail suggested in Fig. 3, the thickness for the ordinary case work for this frame being $\frac{3}{4}$ in. and the width of both stiles and rails 2 or $2\frac{1}{2}$ in. Such a frame is usually jointed with dowel pins, and the corners to receive the posts cut out after the frame is made up, as indicated in Fig. 3. Here, again, as frequently happens, the front part of the frame is exposed to view, as will be noted under the drawer in Fig. 2, and this part of the frame must be of the same wood as the entire construction. Usually when it is not in view the frame is of basswood.

The "construction frame" is a means not only of giving a stiff construction, but also affording a place to secure sliding strips of a harder material upon which the drawers are to slide. The turned form of

leg and mirror pillar shown to the right in Fig. 1 is offered as equally appropriate if the plain post is not desired.

Fig. 2 has the added attraction of the swinging side mirrors, so much desired in dressing the hair. A certain delicate character and finish should be given to the making of these mirror frames and material of $\frac{7}{8}$ in. thick and having a finished width of $1\frac{1}{8}$ in. will make frames amply strong, yet light in appearance. Make the rabbet for the glass $\frac{1}{2}$ in. deep and treat the face of frame to a low round shape. Cover back of framing with $\frac{1}{8}$ in. paneling or veneer, neatly secured with round head brads. As thin stock is hard to secure, a certain quality of hard-pressed straw board is being used very generally for such purposes. The middle mirror is held and stiffened by two cleat strips screwed firmly to the frame and to the back rail of the table. Material dressed to a thickness of $\frac{3}{4}$ or $\frac{3}{16}$ of an inch is universally used for most all forms of



Figs. 4 and 5.—Details of Toilet Table Chair Shown in Fig. 2

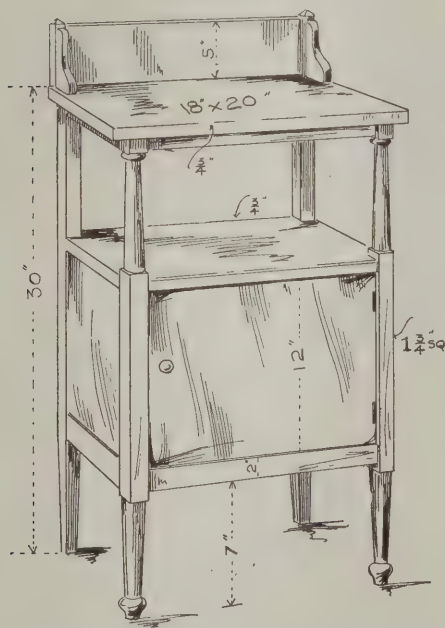


Fig. 7—General View of Wash Stand and Somnoe

furniture, while post stock for the lighter carcasses is secured from $1\frac{3}{4}$ to 2-in. squares, which when reduced to a finished size generally measure $1\frac{1}{2}$ to $1\frac{3}{4}$ in. respectively. This allows for roughness or squaring up of other imperfections. The posts in Fig. 2 are dressed to a square of $1\frac{1}{2}$ in. at the top and reduced to a curved taper of $\frac{7}{8}$ in. at floor.

As to the chair shown in Figs. 2, 4, and 5, it is a dis-

tinct part of the table, and when not in use it is placed directly under the table out of the way. When in use, the low back affords sufficient back support, yet does not retard the use of the arms in dressing the hair—considerations which give these two pieces of furniture growing popularity among women. As the back posts of this chair are secured from a $\frac{7}{8}$ -in. board $2\frac{1}{2}$ in. wide, sawed to a pattern made from shape indicated, it will not be a difficult chair to make as the two posts are screwed to the seat in a vertical outside width of 12 in. and square to the front.

The curved and tapering front legs are obtained from $1\frac{1}{2}$ in. square stock and are secured by two dowels each to the under side of the seat, having an outside width of $15\frac{1}{4}$ in. The stretchers are $\frac{3}{4}$ in. square.

The seat is of a solid or jointed board dressed to a thickness of $1\frac{1}{8}$ in. and hollowed out in the deepest part to $\frac{5}{8}$ in., forming the saddle effect indicated.

The top slat may be secured by using a draw-knife and spoke shave in producing an even sweep of $\frac{7}{8}$ in.

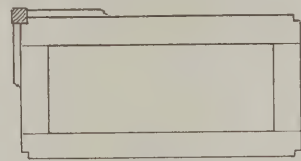


Fig. 3—Plan of Construction Frame

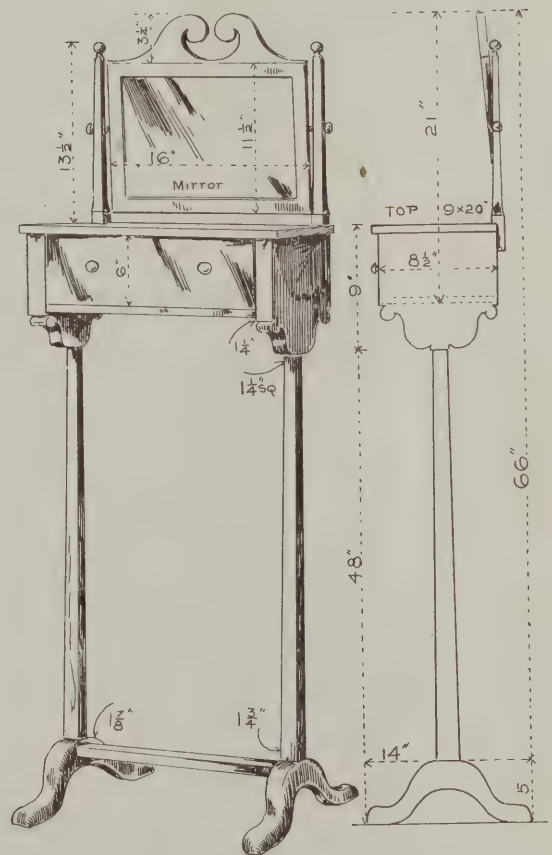


Fig. 6—Front and Side Views of the Shaving Stand

Cabinet Work for the Carpenter

in depth in its length of 13 in., and by a pattern or template previously made, mark out the back curve to produce a curved slat which shall have an even thickness of $\frac{5}{8}$ in. and have a finished width of 3 in. and length sufficient to project well over the shouldered out ends of posts. After the chair is set up ready to receive the slat and banister the excess of length may then be marked and cut off to have an overhang of $\frac{1}{8}$

in. on outside of posts. Use a depressed screw on each post and fill up after with flush plugs.

The banister may be flat, measuring 4 in. in width and $\frac{1}{4}$ in. in thickness.

Figs. 4 and 5 will give further information about the building of this chair, and in passing it may be mentioned that the same directions apply in building a reception, or light hall chair, except that the back would be continued to a customary height of 20 in. from top of seat, and 18 in. would be the height from floor to top of seat, instead of 19 in., as shown.

My purpose in describing the dressing table was that with the comforts of the ladies so well provided for, you may go on undaunted in providing yourself with an equipment for the bedroom or the bathroom, which will make the operation of shaving a real pleasure. The shaving stand, Fig. 6, showing front appearance and side view, will, I am sure, house all a man's toilet articles, and from its light open construction permit him to move it about to secure favorable light. In these days of lighting by electricity a cord and a bulb stand will put the shaving operation into a real luxury.

For its height over all, of 66 in., the foot and shaft are in this instance made of $1\frac{3}{4}$ -in. material, the shaft being tapered on four sides from bottom to top, to $1\frac{1}{4}$ in. square, where it is firmly doweled with a large long dowel, to the ends of the case, which are also $1\frac{3}{4}$ in. thick. This shaft properly, however, should continue through the center of these end panels and be planed off, and scraped smooth with the main surface. This method would give unquestionable strength and well pay for the added care of producing good work.

Make use of the "construction frame" referred to in Fig. 3 for constructive strength and for the drawer to slide upon.

The mirror standards are made of 1-in. squares of well-selected stock for strength and are secured in the manner shown. They can be left straight or given a taper, as shown, with a neatly turned ball at the end. The mirror frame is plain like a picture frame, with the top ornament added, such as the open pediment shown, or some other simple Colonial feature. The foot, while it may properly be left smooth and square edged in its final finish, may be safeguarded from damage and mar in use by giving the top edges a well-rounded form. In place of the single swinging mirror a triple form of mirror similar to that provided for in Fig. 2 is often desired for shaving operations.

For guest room or a room not provided with running water, a washstand and somnoe will be found to be a most necessary form of furniture. Fig. 7 indicates sufficiently the construction and manner of making it. This form is very frequently in harmony with other furniture in a bedroom when made in basswood or maple and given an enamel or old ivory finish. A $\frac{1}{4}$ -in. plate glass is now much used for the top of such furniture, giving a surface easy to clean and permitting a lace or embroidered doily or scarf to be laid under as an added attraction of neatness and daintiness.

Present and Future of the Building Industry

Some very pertinent comments touching the present condition and future outlook of the building industry are contained in the address made at the annual meeting of the Cleveland Builders Exchange by retiring president J. C. Skeel. He pointed out that in any review of present business activities in Cleveland the fact that the city is growing with increasing rapidity is easily apparent. Statistics compiled in the office of the building inspector indicate that permits issued to November 1 reached a total of \$14,552,306 as compared with \$13,689,757 for the corresponding period of 1911.

In regard to the future outlook of the industry he said:

"While Cleveland is forging ahead in population and commercial strength, becoming more metropolitan from year to year, there is need of caution if building conditions are to remain as peaceful as they have been for the last decade. In order that such conditions may continue to exist, there must be a closer co-operation among the building contractors, a large percentage of whom are represented in our exchange. Among the dangers which seem at present to cloud the outlook is the attempted enforcement of the 'No Card No Work Rule,' which is both vicious and un-American in principle and should be opposed by employers and free workmen alike. This rule strikes at the foundation of the industry, embracing as it does—and as too generally has been brought about—a decrease in efficiency, limiting of production and consequent restriction of business. While wages have been increasing and population expanding, the number of skilled mechanics has failed to keep pace with this progress, and at the same time the amount of work done per day has materially lessened through restrictive rules, not only as to apprentices but also as to work performed by experienced journeymen.

Jurisdiction Between Trades

One inevitable result of the closed shop in any city is the controversy that comes over questions of jurisdiction between the trades. In some cities this has caused more trouble on buildings than any other issue ever raised. Recently our mason contractors were advised that only bricklayers will be permitted to set mantels and tile work, and at the present time the structural iron workers are claiming the sole right to set reinforcing rods in concrete work. During the past season numerous difficulties have arisen over the setting of sidewalk lights and the placing of metal frames for windows. In some instances frames set by carpenters have been forcibly removed at night and the contractor has been compelled to have them re-set according to directions of the walking delegate of another trade. Do these things promote the facility of work or do they lessen the cost of production? Most decidedly not. How may these things be opposed if not by thorough organization on the part of those who are from principle opposed to them? In this connection I want to say that the public should be aroused to the hurtful influence of such practices upon the general business conditions of the community. Too often the owner overlooks the principles involved and regards the delays on his building as due to a "mere squabble between the union and the contractor" when in fact he is indirectly if not directly, a party to the controversy and his interests financially as well as otherwise demand his attention to it.

One of the smallest business buildings in New York City is that which has a frontage of 5 ft. on Broadway at the corner of Worth Street and which has been occupied as a cigar store for many years. It appears that in 1844 Judge James R. White bought the corner plot which then had a frontage of 25 ft. but soon afterward Worth Street was widened and 20 ft. was taken off the property on the south side for the purpose, thus leaving the corner as it now remains. Some idea of the value of such a strip of land in the business section of New York City may be gained from the statement that on the assessment books this strip with a frontage of 5 ft. and a depth of 100 ft. is valued at \$50,000.

Toronto, Canada, is to have a new 600-room hotel which is estimated to cost \$3,000,000.

LITTLE CHATS WITH BIG BUILDERS

An Influential Builder of Chicago Who Desires to See the City Developed Along Lines Tending to Make It More Beautiful

IT was in the year 1851, in a remote little village in the State of Connecticut, that a boy was born who was destined to play an important part in the building activities of the Middle West. The boy in question has now reached maturity and is no less a personage than John D. Corlett, president of the Builders and Traders' Exchange, Chicago, Ill.

Mr. Corlett is the human encyclopedia of the building fraternity in Chicago. It was at the early age of three that he went to Chicago, and even at the period of his early youth he took a vital interest in carpentry. In a recent interview Mr. Corlett recalled many instances when he was severely chastised by the parental hand for driving nails and screws into convenient tables and chairs about the house. It was at the age of 14 that he commenced to work hard and has been at it ever since. His entrance into the building game did not come to him through heredity, for his father was an engineer, but came through a purely personal liking for the business. When 18 years old he became foreman for one of the largest Chicago contractors, which position he held for many years. He filled many responsible positions in the city of Chicago and learned the building business from A to Z.

In the year 1885 Mr. Corlett did two important things. In the first place he went into business for himself, and in the second place he became a member of the Builders and Traders' Exchange, and has been associated with that organization ever since. During his 27 years of service to the Exchange he has held many positions of importance. It was in January of the year just closing that the Exchange did Mr. Corlett the honor of electing him president for the ensuing year. As one of the directors of that body Mr. Corlett held the position for a period of six years.

The Builders and Traders' Exchange is in healthy and flourishing condition, and its financial standing is such as to prove a credit, not only to the organization itself, but to each member individually. There are at present on the roster 450 names and the Exchange is one of the largest and strongest of its kind in the country. Mr. Corlett's presence in the Exchange has been largely responsible for the splendid position it now holds in the building world. At the annual excursion which took place in Milwaukee on September 14 and 15, Mr. Corlett was presented with a handsome, artistically monogrammed, eighteen-karat gold watch as an appreciation of his faithful services to that administration.

Apart from his business obligations, Mr. Corlett is prominently active as a churchman and is also well known in lodge and social circles. As a member of the Masons he holds the 32d degree.

No man has had more opportunity or more desire to watch a city grow than Mr. Corlett has had to study the

city of Chicago. Ever since the memorable fire of October, 1871, he has watched Chicago's wonderful development and has taken a personal interest in building activities. The ordinances that were recently framed in Chicago were made stronger and more forceful by Mr. Corlett's influence as a committeeman.

In a recent talk with the writer Mr. Corlett among other things said: "I have been in Chicago since I was a boy and have followed minutely the wonderful way that Chicago has been built up, especially during the past few years. My only regret is that I am sorry to see that such enormous sums are being spent on new buildings and improvements in the 'loop' district. What I am in favor of and should like to see is a broader and more beautiful Chicago. I think that the money that is now being disbursed could be used in a

far more practical way by developing the property outside of the down-town district. This I consider would go a long way to make what every citizen wants Chicago to be—a City Beautiful, and this I feel sure will come in the near future and will strengthen Chicago's claim as one of the greatest cities in the world."



John D. Corlett, President of the Builders and Traders' Exchange of Chicago, Ill.

Building Progress in Winnipeg, Canada.

Statistics which have been compiled covering building operations in Winnipeg, Manitoba, for the period from January 1 to November 15 of the year just ended, show that the city is building along remarkably broad and substantial lines and that the total for the period named is \$19,250,000. It is confidently expected at the office of the Building Inspector that for the year the total will reach the 20 million dollar mark. The figures indicate that 71 apartment houses were erected

in 1912, representing an investment of \$3,044,000, and that 9 of these buildings cost over \$100,000 each. The average for all apartment buildings erected was a little over \$42,500 each.

In the erection of 15 bank and office buildings \$2,780,000 were involved. There were 69 permits for factories and extensions costing \$1,384,000, and there were 37 warehouses costing \$844,000.

Strongly indicative of the prosperity of the city is the 121 handsome residences erected, each costing over \$10,000, with 26 costing over \$20,000 each, and 9 over \$25,000 each.

During the first 10½ months of 1912 the apartment houses and high-class residences alone was more than the total building permits for the year 1908. The 5080 permits issued in the 10½ months named were double the number of those issued in 1909, and exceeded the total permits issued for the five years from 1900 to 1904, inclusive.

PITTSBURGH'S FIRST CEMENT SHOW

An Interesting Collection of Exhibits of Cement
Products and Appliances—Some Highly
Instructive Demonstrations

IN conjunction with the convention of the National Association of Cement Users which was in session in the Fort Pitt Hotel in Pittsburgh for nearly a week, commencing Tuesday, December 10, the National Cement Show was opened in Exposition Hall, Pittsburgh, on Thursday evening, December 12, and will continue until December 18. There were 253 different exhibits and all of absorbing interest.

Some of the Exhibitors

Among the more important concerns making goods of interest to our readers were:

Acme Equipment & Engineering Company, Cleveland, Ohio.
American Saw Mill Machinery Company, Hackettstown, N. J.
Art Marble Supply & Equipment Company, 347 Market street, Newark, N. J.
Art Stone Company, Waynesboro, Pa.
Badger Concrete Mixer & Machinery Company, Madison, Wis.
Blaw Steel Construction Company, Westinghouse building, Pittsburgh.
Blystone Manufacturing Company, Cambridge Springs, Pa.
Carnegie Technical Schools, Pittsburgh.
Concrete-Cement Age Publishing Company, Detroit.
Concrete Products Company, Coraopolis, Pa.
Detroit Steel Products Company, Detroit.
Eureka Machine Company, Lansing, Mich.
Fireproof Materials Company, 320 Liberty avenue, Pittsburgh.
Hobbs Concrete Machinery Company, Detroit.
Ideal Concrete Machinery Company, South Bend, Ind.
Integral Waterproofing Company, Hudson Terminal, N. Y.
The Kent Machine Company, Kent, O.
Knickerbocker Company, Jackson, Mich.
Kramer Automatic Tamper Company, 421 So. Adams street, Peoria, Ill.
Lansing Company, Lansing, Mich.
David Lupton's Sons Company, 220 Broadway, New York.
McCoy Silo Form Company, 1301 Berger building, Pittsburgh.
Miles Manufacturing Company, Inc., Jackson, Mich.
The Multiplex Concrete Machinery Company, Elmore, Ohio.
The National Roofing Company, Tonawanda, N. Y.
Ohio Post Mold Company, Nicholas building, Toledo, O.
Peerless Brick Machine Company, Minneapolis, Minn.
D. & A. Post Mold Company, Three Rivers, Mich.
Read & Morrill, Brooklyn, N. Y.
Sandusky Portland Cement Company, Sandusky, Ohio.
Sasgen Brothers, 2053 Racine street, Chicago.
Simpson Cement Mold Company, 115 Vine street, Columbus, Ohio.
Standard Scale & Supply Company, 1345 Wabash avenue, Chicago.
Trussed Concrete Steel Company, Detroit.
United Wire Tie Company, Nicholas Building, Toledo, Ohio.
Universal Crusher Company, Cedar Rapids, Iowa.
Universal Portland Cement Company, Chicago-Pittsburgh.
Waterloo Cement Machinery Company, Waterloo, Iowa.
C. S. Wert, Kendallville, Ind.
Wheeling Mold & Foundry Company, Wheeling, W. Va.
Zeiser Brothers, Berwick, Pa.

Pittsburgh played a large and important part in the exhibit, the city having an elaborate and pretentious display of the Larimer avenue and Atherton avenue concrete bridges and drawings and water color sketches of proposed municipal work. Both the University of Pittsburgh and the Carnegie Institute of Technology had interesting exhibits of their work. An architectural exhibit by Pittsburgh artists and designers formed the largest single exhibit and included a display in dwelling, commercial and manufacturing plant construction possibilities. Slabs of artificial marble which defy the expert to differentiate from the real article, concrete lumber, concrete furniture, concrete burial cases and mausoleums that will last forever, the model poured house—in fact, everything that is made of concrete was on display.

Some Popular Features

Among the novel and popular features of the show were the cement golf ball, cement pipes, "guaranteed not to bite the tongue," the concrete potato peeler and the concrete gun that shoots balls of concrete with unerring accuracy and builds a dwelling before your eyes with amazing rapidity—these held the interest of every layman as well as that of the scores of architects,

engineers and contractors that were attracted to Pittsburgh by the cement show.

Special attraction was offered to the suburbanite and farmer in the demonstrations of cement application. An enormous silo, built entirely of concrete, the building operation being carried on piecemeal during the life of the show, was of unusual interest to farmers. One exhibitor of concrete terracing "imported" into the building an acre of grass sod for the purpose of adding realism to his exhibit. Art stone, embellished in many hues and tints, showed one of the newest applications of concrete, while concrete blocks faced with glossy tile was another novel exhibit. One of the attractive exhibits consisted of the reduction of granite street paving blocks by a crusher and the application of a concrete pavement.

The United States government was one of the exhibitors in the show. Aside from three booths showing government road work, testing of cement and concrete, the government showed moving pictures with lectures delivered by officers from the Bureau of Commerce and Labor.

Election of Officers

The National Association of Cement Users elected the following officers:

President... Richard L. Humphrey, Philadelphia, Pa.

Vice-Pres.... Arthur N. Talbot, Urbana, Ill.

L. C. Watson, Boston, Mass.

Treasurer... H. C. Turner, New York.

The report of the committee on nomenclature was presented by Peter Gillispie, and Norman S. Sprague, superintendent of the Bureau of Construction of the Department of Public Works of Pittsburgh, talked on "Recent Applications of Concrete and Reinforced Concrete in the City of Pittsburgh."

That the science of concrete making is an old one, despite its comparatively recent general application, was disclosed at the interesting exhibit at the cement show at the Exposition.

The Banquet

The convention of the National Association of Cement Users closed with a banquet at the Fort Pitt Hotel on Thursday night, December 12. George A. Meilson, general manager of the Braeburn Steel Company, was toastmaster and the principal speakers were George R. Wallace and Dr. George C. Johnston, of Pittsburgh, and John R. Scott, assistant sales manager of the Carnegie Steel Company at Cleveland, Ohio.

The banquet was attended by about 300 delegates and friends.

The march of progress in realty improvement in the older section of the city of Boston finds in its way the famous historic house which during colonial times was owned by John Hancock. In 1785 he deeded the property to another member of the family, Ebenezer Hancock and since that date up to the present time there has been only one sale of the property. This was in 1867 when it was purchased by Jesse Wadsworth, who conducted the Marshall House, a famous old tavern, adjoining. The old building will now be torn down and upon its site will be erected a modern structure.

MAKING AND ERECTING WOODEN TANKS

Circular Wood Stave Type Most Frequently Used—Best Woods for the Purpose—Relation of Diameter to Hight

By W. B. GRAY

ELEVATED outside tanks are most frequently of the circular wood-stave type because of their length of service, cheapness in many localities, ease of erection and repairs, their comparative immunity from frost and the fact that some leakage at times, out of doors, is attended with slight consequences. These tanks are by no means confined to outside service, however. With a safe pan, such as is absolutely necessary for Metal-Wall inside tanks, the circular wood tank is preferable to other types in some instances, and for one reason or another is doing service in many places. Cedar, cypress, chestnut and white pine woods

eter, exceeding in hight, usually. If the hight is unusual the expense of safe hooping staves of minimum thickness increases. It is best to make no tank bottom less than 2 inches thick, and, in general, strong bottoms are cheapest as the extra expense on grillage and drainage (carrying the whole weight of tank and contents) for a light bottom is greater than the possible saving on staves.

Tanks of any type can be had in the market, but

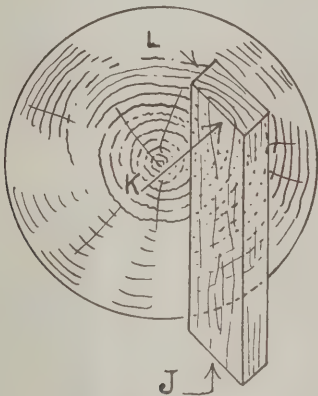


Fig. 1—Co-efficients of Conduction

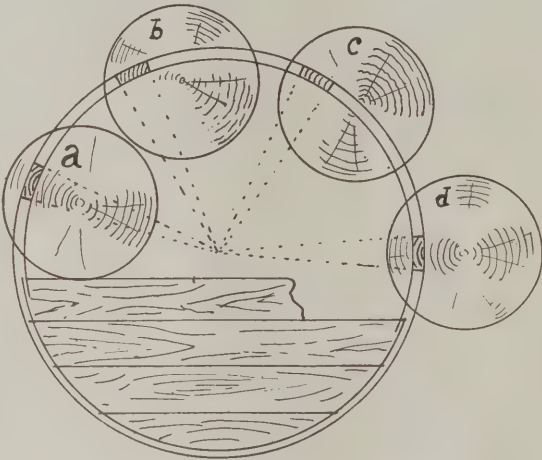


Fig. 2—Selection of Wood for Staves

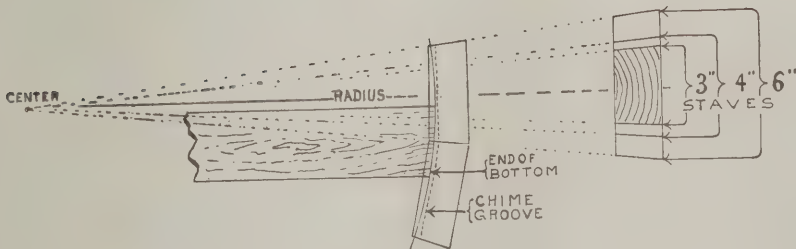


Fig. 3—Templates for Various Wood Staves

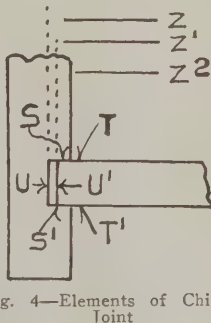


Fig. 4—Elements of Chime Joint

Making and Erecting Wooden Tanks—By W. B. Gray

are suitable. Cypress is the commercial ideal, especially for large tanks, though yellow pine and other woods are used. Staves and bottom 3 inches thick for 35,000 to 50,000-gallon tanks, 2½-inch for 20,000 to 35,000 gallons; 2 to 2½-inch for 5000 to 20,000 gallons, and 1½, 1¾ or 2-inch staves and 2-inch bottom for 5000 and less are of sufficient strength, governed somewhat by relative diameter and depth, as may be noted in practice.

The larger sizes do not require a stave heavier in proportion to relative contents, for the reason that their diameter to height is seldom less than as 3 is to 2, and sometimes as much as 4 to 1. This is partly by design to avoid hooping and stave strength to counteract excessive lateral pressure, partly to keep within easy limits of suitable stave timber and partly on account of the dimensions necessary for stable foundations. Small sizes are of about equal hight and diam-

instances of excessive freight, happy local facilities in the way of tools and cheap timber or of long-service guaranty where the contractor desires to have the initial quality of the best rather than make up deficiencies possibly greater in cost later, may determine one to see personally to the making as well as erection of a tank. The work is simple and a brief presentation of some of the points involved will enable a carpenter to get out the material either by hand or with planing mill help.

Staves are not ordinarily curved to the circumference of the tank, but have parallel inside and outside faces; the joint edges are tongueless planes converging to the center of the tank. The width of staves with chord faces is limited by the depth of chime-groove suitable for the thickness; by increasing need for curved hoop surface in very wide staves and by the reduction of joint surface that would result from

arc the hoop side. The effect of width on the chime joint is illustrated by the groove-depth, inside face and end-of-bottom lines in Fig. 3, from which it will be noted that the wider the stave the deeper the groove must be to avoid butting and the less is the projection of bottom into groove at the joint—too little hold at any point in the chime may cause very stubborn leakage that is not susceptible of swelling “shut.” Six inches is considered the limit of width for staves of large tanks. Three to $3\frac{1}{2}$ -inch does well for 3 to 6-foot tanks; $3\frac{1}{2}$ to $4\frac{1}{2}$ or 5 inches for 6 to 12-foot and uniform or random width, 6 inches or less for tanks over 12 feet diameter.

Selection of the Timber

There is more in the selection of timber than is usually believed. It has been determined that there are three coefficients of thermal conduction for woods according with directions *J*, *K*, *L*, Fig. 1. The calorific loss varies for different woods, but the average for *J* compared with *K* is about as 30 is to 11; with *L* as 30 to 10. Considering the slight difference in thermal radiation between *K* and *L*, the stiffness edgewise and small water absorption by side surface of a timber cut from the log position shown in Fig. 1, and at *a*, Fig. 2, it appears best to make staves of lumber that will bring the ligneous layers parallel with the hoops and the annular rings together as joint-surfaces (the position of nature), as would result if all the staves of a tank were from position *a*, Fig. 2. Sections *a*, *b*, *c* and *d*, Fig. 2, afford a basis for studying the relation of grain to stiffness; flexibility and stiffness edgewise and sidewise, likelihood of splitting from nailing, etc., *b* showing the direction of annular rings in quarter-sawn lumber. Fortunately the best kind of pieces for tank staves are those most likely to be found in stock, as they result from the ordinary and economical practice of “slabbing” the log and sawing the flitch straight through, as is done for floor joists, fence boards, etc., without quartering or turning. No special sawing facilities are necessary and any country mill can therefore supply the staves in the rough. When practicable work the staves so that the but-end as to growth will be at the bottom end as a stave.

Thickness of Stave Lumber

Stave lumber is not likely to be sawed of uniform thickness, and though it need not be made so it should be reduced to a common thickness at the chime, and the bottom groove should be cut to leave the same thickness to hoop face in each stave. Two to four inches of end below the bottom of groove should be allowed, according to thickness of bottom. The staves may be of varying width according as the lumber will work up, keeping in the neighborhood of widths for sizes already mentioned. It will be better to make a templet block for each width of stave if the beveling is to be done by hand. Heavy cardboard or a mere diagram may also answer for setting the bevel to try the joint faces, which should be approximately true. To make a templet the radius of tank (laid off on a plank) should cut the center of a block representing a section of the stave of a particular width. The width of stave should then be marked at outer circumference, perpendicular to and centered over the radius line. Then strike two radii cutting these extremes of stave-width and with the thickness of the stave set off at circumference perpendicular to and crossing these radii a diagram of horizontal section of a stave for that width is complete. If a diagram is to be used for setting a planer or edger all the widths may be similarly diagrammed over one thickness, as indicated in Fig. 3.

Circular tanks must taper more or less, growing smaller from bottom to top, else the hoops could not be easily placed, would fall off or out of place in dry weather and could not be driven down to place, nor to

check leakage. Some 3 inches or more taper (stave leaning centerward from the vertical) will answer. On an 8-foot tank, 6 inches difference in diameter makes $18\frac{3}{4}$ inches difference in circumference or $1\frac{1}{4}$ inch per stave for 4-inch staves, $\frac{1}{8}$ inch on a side, taper from bottom to top. The stave may be scribed and the whole taper taken from one side. The stave ends are thus thrown slightly out of horizontal when erected, but not enough to be worth considering.

By noting the chime features of Figs. 3 and 4 together the function of the chime-joint as a water-tight connection between staves and bottom will be seen. The staves resist lateral pressure; the bottom sustains the weight; the chime groove holds the staves in place and is the necessary factor of margin for variable tank circumference—inaccuracies of practical work and weather changes before and after erection.

General Taper of Bottom

No general taper of the ends of bottom pieces from too thick for the stave groove down to the groove width should be made. Let the entering bottom edge and for some distance back be practically with parallel sides, with slight corner chamfering. If the bottom is to stand even a few days before erection leave it *full* thickness of groove width to avoid looseness from drying out; if a stave taps over too tight a block plane can be used on the bottom as necessary, when erecting. Surfaces *S*, *S'*, of the groove, and *T*, *T'* of the bottom, Fig. 4, are all that can be depended upon to hold the water in at the chime.

Any attempt to utilize surfaces *U* and *U'* by butting will result in “chime-binding” the staves as at *Y*, *Y'*, Fig. 5, and thus subject the stave joints to leakage from a cause that is both difficult and expensive to remedy. Loose oakum can be used to advantage in the space *U* to *U'*, not as a dependence for tightness but as a precaution. Loosely laid in the back of the groove, it is a good trap for sediment which helps to choke up a leak, and the swellage of the oakum aids in taking care of leakage that gets by stand.

Suppose the distance *U* to *U'* to be $\frac{1}{4}$ -inch in an 8-foot tank, the difference in circumference between *Z* and *Z'* diameters would be $1\frac{6}{10}$ inches. This is too small to divide in any way over uniform or multiples of different widths, with a view to prefiguring the stave circumference to make it come out right in erection, the drying out factor alone prohibits such a calculation with wood. It is therefore best to elect an outside circumference for hoop length purposes; allow $\frac{1}{8}$, $\frac{3}{16}$ or $\frac{1}{4}$ -inch *Z* to *Z'* space, according to size of tank; $\frac{3}{8}$, $\frac{1}{2}$ or $\frac{5}{8}$ inch *Z'* to *Z''*, according to thickness of stave, for groove depth; cut the bottom to agree with *Z'* diameter; make *enough* staves, with the angle of joint faces proper for their width as before directed, and finish the stave circle when erecting by altering the last stave needed to fill the gap. This leaves the chime space *U*, *U'* to be preserved by close attention when tapping the staves to place on the bottom as they are erected. The chime space may be assured in several ways. When one stave has been set the joining edge of the next one has only to be brought “flush,” provided bottom edge and chime groove are regular, as they should be; the other edge is in view. A segment board with proper arc can be tacked to bottom with arc edge standing back the proper distance to which the inner face of staves can be tapped up to. A leather or other strap can be used to give the desired clearance. This, however, requires strips within, tacked to bottom with end against stave after stave is set and before strap is pulled out, to hold against braces footing on platform floor and against stave opposite chime groove, to hold stave in place—unless nailing is resorted to. The inner strips or segment board have to

be used because either nailing or bracing needs support from behind to keep the stave from tapping up tight. Where the chime groove is wide sometimes a narrow strap or strip will answer to hold the stave off, but whether thus held off or by segment board, it is a more practical way than is outside bracing for holding stave in place to boldly nail through the center of width of the stave into as near the center of bottom thickness as the scheme for holding off will permit. A single nail to the stave will do no harm and if pointed to one side of the tank center (head leaning toward the erected staves) it will resist any tendency of the stave to work or jar off by drifting it tighter against the stave next to it.

To erect the tank, assuming the platform ready and dunnage placed, hoops cut and draw-bolt ends attached, place the bottom across the dunnage, not for-

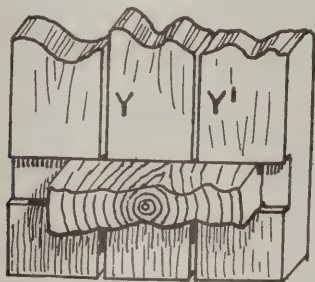


Fig. 5—"Chime-bound"

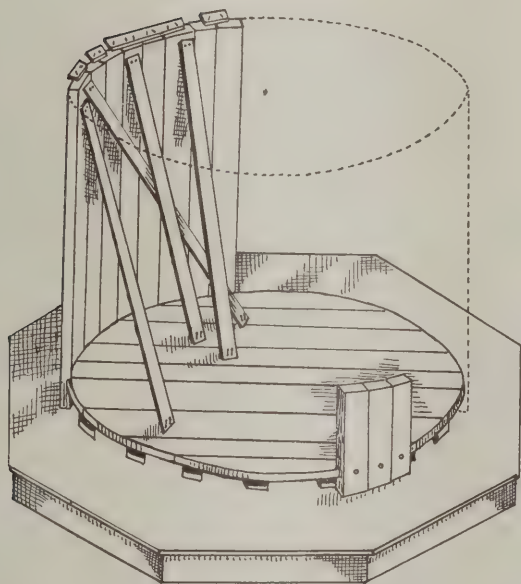


Fig. 6—Erecting a Circular Tapering Wooden Stave Tank

stave ends in the foreground, it is usual and proper to also foot an outside brace against the first stave from platform to chime high to keep it from pushing off. A second stave is then added, tacked to place at the bottom and held in line at the top by a block nailed across the joint. Proceed so until the fourth stave is reached; plumb it and fasten to position with a brace, as shown in Fig. 6, and so on, mixing the staves, if of different widths, and plumbing and bracing (with two braces, if necessary) every third or fourth stave to correct the contour, until the gap is reduced to approximately two staves. If by measuring the gap is found to be slightly less than any two staves remaining, reduce the wide ones until they equal the gap; if the gap is considerably less than two staves it may be best to divide the reduction by taking some off of each and the most off of the wide one.

The stave circle being completed, the hoop positions (bottom edge line), if not previously indicated, should be marked at intervals around the tank, and the hoops drawn up moderately somewhat above the marks. Any stave noted to be projecting inward or outward at points should then be jarred into line and the bottom, top and middle hoops screwed up a little tighter and then tapped down to the line with the back of an axe, blunt wide calking tool or bar. The intervening portions of the staves should then be examined for irregularities, aligned as well as possible, and the other hoops tightened some, if expedient, and driven down to posi-

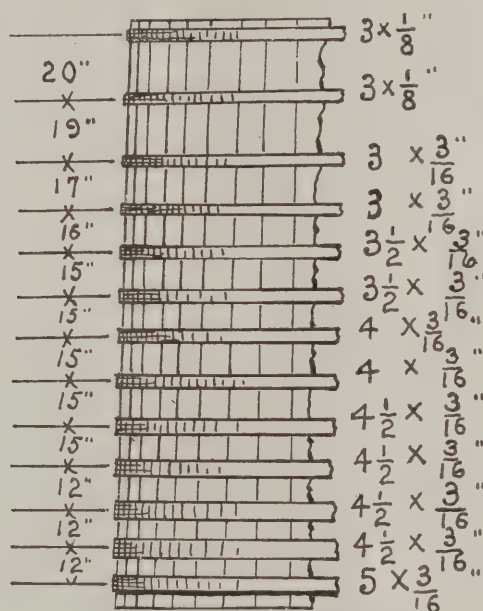


Fig. 7—Disposition of Hoops

Making and Erecting Wooden Tanks

getting provision for pipe attachment, dowelling, etc. See that it projects evenly and enough beyond the ends of dunnage at all points. Paint the board edges with thick white lead in oil (the same may be done with end edge and chime groove later), anchor to the dunnage at pipe-hole or otherwise, and then begin by plumbing the first stave, tapped up, *out of plumb* with reference to converging to tank center equal to the taper on a side; *plumb* as regards the center of width or either joint-edge being all in the same vertical plane. Two braces are needed to tack the first stave into position. Their positions are shown in Fig. 6, first stave at the left, the braces being strongly tacked to the stave near the top and spread to form, with the stave, a stiff tripod when tacked to the bottom boards as shown. No outer bracing is shown in the sketch (nor is the segment board to tap up to), but in addition to driving a nail through the stave as stated and as indicated in the

tion. No undue strain should be brought to bear at this stage of the work. How tight to draw the hoops will depend upon how dry they are at the time—swellage of staves when water is admitted to the tank may burst the hoops if they are pulled too tight to begin with. After swelling, if leakage is still apparent, the draw-bolts can be tightened. It is necessary to anchor the tank, through pipe connections, or straps to floor timbers to keep it in place under wind pressure when empty.

The pressure tending to burst a tank at any point below the surface of the water is equal to 62.5 multiplied by the head (distance from point considered to top of tank) and then by the diameter of the tank. The product thus obtained divided by a factor of safety for the hoop material gives the cross-sectional area of metal for the hoop at the point considered. Ten thousand pounds per inch is usual for steel, but as a

hoop gives double the resistance of ordinary tension on a bar, the product referred to should be divided by 20,000 for the area of hoop section. The same result is obtained by multiplying 31.3 by the head and by the diameter and then dividing the quotient by 10,000.

The writer proportions hoops for very large tanks in this manner, with the exception of those hoops that come above a line 4 ft. from the top of the tank, and these he makes the same, or very nearly the same as the one that comes 4 ft. or more from the top. This is done because, while the water pressure in the tank calls for ridiculously light hoops near the top, deterioration, force of swellage from dampness, etc., must be taken care of regardless, and no disrupting pressure formula provides for such. For medium to small tanks it is the writer's practice to add to the pressure formula requirements a factor based on the compression surface in one joint face of one stave. The thickness of staves in inches multiplied by the length in inches gives the compression surface in inches. This is multiplied by 100 to 200 according to the dimensions of the tank, and the product divided by 10,000. The inches of section thus found are divided by the number of hoops and the quotient added is the pressure formula requirement for each hoop.

Use of Flat Hoops

Flat hoops are best. Round ones have too little bearing surface for water tanks—the wood compresses too easily—though silos are quite generally hooped with round rods. The sizes and locations of hoops for a 50,000 gallon tank, as proven by long experience to be safe, are given in Fig. 7. The distance and sizes for hoops for smaller tanks of the larger sizes may be proportional. The hoops catalogued by manufacturers of tanks ready-to-erect generally represent the minimum in number and strength of hoops for the different sizes catalogued and are a fair basis from which to infer necessary hoopage. Calculations based on the tensile strength of iron or mild steel need to carry a high factor of safety. Hoops are thin; their surface relatively large; they are exposed to the weather; one side cannot be reached to repaint; they are subjected to wide variation in strain and the water may be of a character to favor rapid corrosion though the moisture reaching the hoop through the stave. The hoop subject is well worthy of more room than it is possible to give it in a work of this kind, and it behooves the builder of a tank to have the hoops amply strong for long service. Some disastrous wrecks of large tanks have occurred through light or old corroded hoopage.

Painting New Woodwork

In painting new woodwork a consideration of the character and condition of the surface is the most important factor. The kind of wood used in the building should be carefully studied, and it should be determined whether hard open-grain or hard close-grain; soft close-grain or very soft open-grain; soft and spongy; compact or solid, and also whether it is kiln or air-dried timber, says a writer in the *Modern Painter*. If it is kiln-dried, and the drying process has been carried on too rapidly, the wood may have become case-hardened, leaving it brittle and lifeless. The timber having thus lost part of its vitality or physical strength, the paint must be mixed to a consistency which will penetrate to a depth that will insure satisfactory results. If the paint is of a heavy consistency, and lies on the surface, the fibers of the wood will break away through contraction and expansion, bringing the paint with it. This trouble is always laid to the paint while the real cause is that the primary coat was not properly reduced to pene-

trate a sufficient depth to insure the proper binding.

Wood that has been air-seasoned has had little or no opportunity to lose any of its strength or vitality, and it will hold paint well, if the priming is properly reduced and is thoroughly brushed into the grain.

While it is not practicable to have separate mixes of paint for the various characters of timber in the same building, *it is practicable and necessary* to examine the work to be painted and note its characteristics as to absorption and drying qualities; also the condition of the timber—whether old, discolored, and partly decayed from lying in the log too long before being cut or in some damp place after it had been cut up. Carefully consider whether two or three coats are necessary.

It is impossible to do satisfactory two-coat work on certain kinds of wood. A priming coat mixed heavy enough to assist in hiding the dark spots or grain will not contain sufficient oil or thinners to fully satisfy the wood, and the wood will soon rob the paint of its oil or binder. The priming coat being applied heavy will not allow sufficient penetration of the second coat to assist in supplying the wood with sufficient oil to hold the paint to the surface, thus resulting in the paint breaking loose in scales, elastic on the outside and lifeless on the side next the wood.

Charges to Owner of Cost of Compensation Insurance

One of the important matters to be considered by the builder in connection with the Workmen's Compensation Law is the manner in which the added cost of construction due to this increased insurance shall be accounted for in making settlement with the owner, especially in the case of day or percentage work. At a meeting of the Master Carpenters affiliated with the Master Builders' Association of Boston the consensus of opinion seemed to be that it was better to make a separate and specific charge for compensation insurance rather than to make an increase in the charge for labor per hour. In this way the attention of the owner would be forcibly drawn to the matter and he would learn that compensation insurance is a factor of cost with which he must reckon.

A Simple Door Fastener

A simple door fastener recently brought out in England is of a nature to be readily carried in the vest pocket and consists of a small perforated steel plate, at one end of which are two teeth bent at right angles to the plate, while to the other is attached a short stretch of chain carrying at the end an iron pin. In order to use the device and securely fasten the door all that is necessary is to press the teeth into the rabbet of the door frame, then close the door and insert the pin in one of the three holes with which the plate is perforated. In this form the fastener is adapted more especially for the use of travelers who sometimes find themselves in a room in which they wish to secure themselves against intrusion, but which has a defective lock or possibly none at all. If it is desired to place the fastener permanently on the door frame a screw may be inserted in one of the holes in the plate, this being countersunk for the purpose.

The object of steam heating is to make buildings comfortable, so also is the object of cooling buildings. Why, then, should not the two go together and combination cooling and heating systems be installed?

NEW HOTEL BUILDING IN MANILA

A Seven-Story Structure of Reinforced Concrete Resting on Piling of Native Hardwood—Impressive Architectural Features

By MONROE WOOLLEY

UNTIL a little more than a year ago the city of Manila was notorious to travelers as a place sadly lacking in suitable hotel accommodations.

By reason of the fact that tourists and commercial men are inclined to pass the city by, the American business men determined to erect a hotel that would not only be a credit to the capital of the Philippine Islands, but would prove a hostelry that would attract globe-trotters from afar.

The new hotel, built of steel, tile, and concrete, and costing more than a million pesos, stands on reclaimed ground where once the army's big white transports lay at anchor in Manila bay. The building rests on piling of native hardwood, driven to a depth of sixteen meters. The building proper is of reinforced concrete, seven stories including basement, but the ground floor and main rooms have wooden ceilings, highly polished and carved.

The main entrance faces the new Luneta, which skirts the bay and runs parallel to the old Luneta now lying further inland since the reclamation project has been completed. The hotel site is nearly two square blocks in area, and has beautiful sunken gardens, lawns, palm bordered drives, fountains, and flower beds. The Cavite boulevard, following the bay shore for many miles, passes a side entrance.

An impressive architectural feature of the first floor are the monster arches and pillars in the main lobby, 24 by 135 feet. Two grand staircases lead to the mezzanine floor above, one to the east and the other to the west wing. In alcoves in the main lobby are the latest improved electric passenger elevators, possibly the first to be installed in that part of the world, and certainly the first to be introduced in the Philippines. There are many little

booths about the great lobby for the sale of periodicals, curios, etc., and a modern bar, a haberdashery, and a barber shop are on the first floor.

The dining room affords a magnificent view of Manila bay, Cavite, and the marvelous sunsets behind Corregidor island at the mouth of the harbor. The size of the dining room is 40 by 75 feet, and in addition there is a large veranda which may be used as an auxiliary when the weather permits, and that is pretty much all the time. Twelve-foot corridors surround the building, and ad-

joining the kitchen are the supply and cold storage rooms. The cold storage plant, covering some 700 square feet of space, is the most modern in the islands, but not, of course, as pretentious as the government cold storage, which cost a million dollars. The system includes a coil service for the bars and buffets, and for the distilled water tanks throughout the building.

There are many fine reception rooms, all finished lavishly in fine hardwoods, the principal ones being nearly as large as the main dining hall. The men's reception room has a grill and service room, the grill having separate cooking apparatus from the kitchen. The billiard rooms have American and British tables, which indicates that Manila's British population is worth catering to.

The mezzanine floor has a guest parlor 20 by 60 feet, a children's play room, a suite especially planned for the manager, a butler's pantry, and many suites of sumptuously furnished apartments. In all, the hotel has about 150 guest rooms, more than half of which have private baths. A special feature is the attention paid to air circulation. This is highly necessary in a tropical climate. The



General View of the Completed Building



*A Detail of the Main Entrance to the Hotel
New Hotel Building in Manila—W. E. Parsons, Architect*

lower story windows (all window "panes" are of oyster shell 3 in. square) all have balconies and verandas; the upper corridors and all windows have permanent shades or awnings to protect the eyes from high-lights.

The roof has many fine gardens, from which some beautiful views may be had of the city and the bay. There are two uncovered roof-gardens, each 35 x 100 feet and one large covered garden 35 x 130 feet having an elastic conolite floor for dancing. Steaming tables and refrigerating apparatus are installed on the roofs to keep food and drinks at proper temperature for consumption. In the corner towers of the roof gardens are "Aeroplane" cafés, where the members of the Manila aero club may meet with their friends.

The wooden floors, all of the finest native hardwood, are marvels of beauty. Narra, or Philippine mahogany, predominates; but the finest floors are those of alternate white and black hardwood boards 15 inches in width and highly polished. All the furniture, except where cool rattan and bamboo are desirable, is of native woods, made in Manila, and embracing all the favorite designs, and the Manila hotel is the first in the Far East to have complete inter-communicating 'phones and push-button service.

Manila is a city having a highly paid populace. There are thousands of employees drawing good pay in the insular and federal services out there. Most of these men and women are unmarried, and heretofore the majority of them were scattered all over the city with private families, in apartments, and at the old hotels. The day the new hotel was completed was moving day for all this army, quick to take advantage of the comforts of the big home. The hotel is designed to be a social center for the city, as well as a domicile for globe-trotters. In time it will take rank as one of the best hosteleries in the world.

The new hotel was erected in accordance with drawings prepared by W. E. Parsons and Harry Allyn, associate architects of Manila, P. I.

Meeting of Joint Advisory Committee of Boston Architects and Builders

A short time ago we referred in these columns to a meeting of the Boston Society of Architects and the Master Builders' Association of Boston, at which a Joint Advisory Committee was established. The first meeting of this committee was held November 6 at the Boston City Club, and 24 of the 30 delegates were present. The meeting was presided over by H. H. Kendall of the architects, and in opening the meeting he referred to the establishment of the committee as giving opportunity for practical men engaged in the two divisions of building to harmoniously confer and establish more definite practices. A number of suggestions as to matters worthy of consideration were presented, some being offered by the builders' delegation and some by the architects. Among these suggestions were the following:

"How estimating in competition for building work and award of contracts thereunder may be guarded so that every builder whose time and experience are placed at the service of owners shall be assured of equitable treatment."

"How methods of measurement of various kinds of building work can be standardized so that all concerned may be able to accurately calculate amount of materials needed."

"Feasibility and desirability of separating contracts for the equipment of buildings—such as elevators, heating and ventilating systems, vacuum cleaners, etc.—from general contracts."

There were five sub-committees formed to deal with the following subjects: 1. Estimating conditions. 2.

Contract conditions. 3. Drawings and standardization. 4. Specifications. 5. Division of contracts and subcontracts.

Three architects and three builders constitute each subcommittee and it is planned to refer matters presented to the general committee to the appropriate subcommittee to consider and report back with recommendations

Collapse of the Marquam Building

A wall pier of the Marquam building in the city of Portland, Ore., alterations to which were mentioned in the last issue of the *Building Age*, collapsed November 21, carrying down the second, third and fourth floors, and leaving the portion above suspended only by arch action of the spandrel section at the fifth floor. A little later in the day the next pier south failed, and this section dropped out to the roof, making a hole in the building 26½ ft. wide by 20 ft. in depth, and about 102 ft. high to the top of the building.

The Marquam was an eight-story office building with heavy brick bearing walls of pier construction, and cross division walls about 20 ft. apart. It was 60 by 200 ft. in area, with an Opera House adjoining on the north side. The building was erected in 1890, much of the brick being made by the builder and original owner. The alterations were being made for the present owner, the Northwestern Fidelity Company, and consisted in taking out the east half and a portion of the west end to the second floor, and carrying the building on steel columns and girders above that point. Other alterations throughout the building, making a total expense of over \$70,000, were well advanced. The Sound Construction Company, which was doing the work, had proceeded with great caution and careful planning, and had completed all the work on the east end except about 25 ft. on Sixth street, which was the part that fell.

The first investigation showed the cause of the failure to be crushing of the brick in the first pier that failed. This threw extra load on the next pier, which soon crushed it. There was no failure of the foundation, beams or shoring, which were simply knocked down by the falling walls. The contractors had learned that the brickwork was weak, but the failure showed it to be weaker than they had supposed, as further investigation confirmed the impression received at the first view, the quality of the brickwork being very unsatisfactory. There remains little doubt that the first pier failed by crushing of the brick, and there is no lack of evidence that the second one did. The pressure per square inch is figured at 200 lbs. on the first pier and 266 lbs. on the second, whereas good common brick should stand a pressure of 500 to 1000 lbs. in such piers. The inside bricks were found soft and brittle, and the masonry work poorly done.

After the failure an investigation was made of the remainder of the structure, and it was found that the building could not be made safe without very expensive and general repairs. The owners, who had recently purchased the property for \$750,000, accordingly decided to take down the whole building and replace it with a 12-story steel frame building. Razing of the building began November 27, the east tower, which was still carried on underpinning, being the first section removed, as it was in some danger of falling.

A syndicate has been formed in Kingston, Canada, to erect, during the year, 50 houses to rent at from \$10 to \$12 a month. They thus hope to meet the demand of workmen for cheaper abodes.

SUGGESTIONS FOR BUILDING A HOG HOUSE

Plans and Specifications Designed to Meet the Needs of
the Average Farmer—Bill of Materials

ONE of the buildings upon the thoroughly up-to-date farm which is not always given the attention that its importance would seem to warrant is that for housing the live-pork supply. It is, of course, a well recognized fact that there are many satisfactory ways of building a hog house and that much depends on the number of hogs to be housed and the amount of money that is available for the purpose. In building a hog house the location should be selected with a great deal of care. It should be well lighted and well drained, and if possible the structure should be located on gravelly or sandy

soil. It should be built to extend north and south so that an abundance of sunshine falls into it and on the floor, especially during the winter. It should be dry and clean and should provide coolness in summer and warmth in winter. A room under the same roof for storing the feed, and another for mixing it, will be found of great advantage.

Concrete floors are highly important, as they are easy to keep clean and at the same time are very durable. While a concrete floor is somewhat colder than a board floor this can be readily overcome by the use of bedding. Considering the advantages from the standpoint of cleanliness and

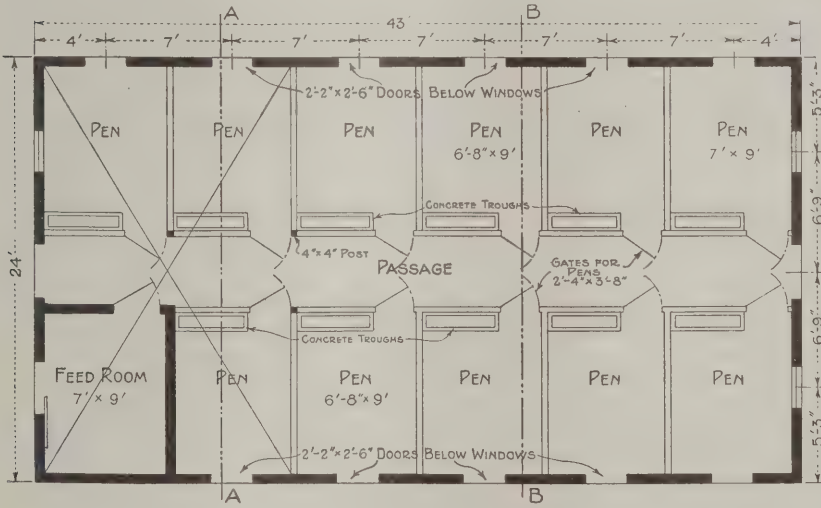
herewith, also cross-sections of the building taken at different points on the plan, thus clearly indicating the arrangement of parts. Some of the pens are 7 x 9 ft. in size, while others are 6 ft. 8 in. by 9 ft. Each pen is provided with a gate 2 ft. 4 in. by 3 ft. 8 in. and where indicated there are 4 x 4-in. posts. The gates open into the central passageway and at the ends are doors opening into the yard.

Bill of Materials

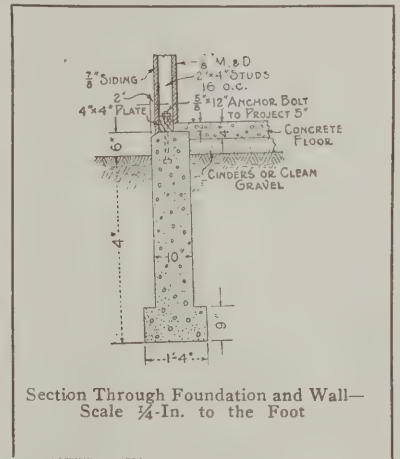
The various materials called for in the erection of



End Elevation Showing Batten Doors Giving Entrance to Main Floor and Also to Loft Above—Scale $\frac{1}{8}$ -In. to the Foot



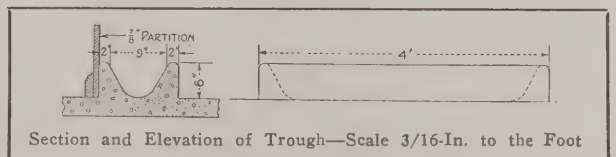
Floor Plan—Scale $\frac{3}{32}$ -In. to the Foot



Section Through Foundation and Wall—Scale $\frac{1}{4}$ -In. to the Foot

durability it is regarded by many as the most satisfactory for a hog house.

The plans and specifications which are here presented are intended to meet the needs of the average farm and a hog house erected according to them will be found convenient, while affording ample protection against climatic changes. It will be observed from an inspection of the plan that there are 11 pens and a feed room. The front end of the building is provided with a loft in which feed may be stored and directly below this is the room for mixing the feed. The floors and troughs are of concrete so that they can be kept thoroughly clean. An elevation and section of a trough are shown



Section and Elevation of Trough—Scale $\frac{3}{16}$ -In. to the Foot

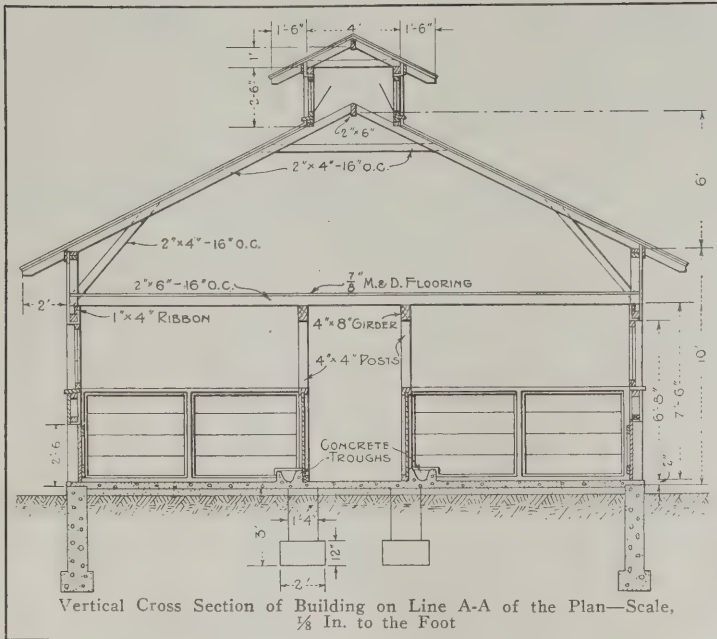
Suggestions for Building a Hog House

this hog house are indicated in the list which follows:

CONCRETE		
24 cu. yds.	Walls and Footings	
	Portland Cement	28 bbls.
	Sand	12 cu. yds.
	Gravel or Crushed Stone	20 cu. yds.

11 cu. yds. Floor Foundation
Portland Cement
Sand
Gravel or crushed Stone

13 bbls.
5½ cu. yds.
9 cu. yds.



WINDOWS:

8 Sash of 8 lights 8" x 8" each
14 Sash of 6 lights 10" x 14" each

FRAMES: { 7 Pieces 2" x 6" x 18' S—4—S Jambs & Head
4 Pieces 2" x 6" x 14' " " " " " "
2 Pieces 2" x 8" x 16' " " " " " "
3 Pieces 2" x 8" x 14' " " " " " "
1 Piece 2" x 8" x 12' " " " " " "
2 Pieces 1" x 4" x 14' " " " " " "
41 Pieces 1" x 4" x 10' " " " " " "
250 Lin. ft. 1/2" x 1 1/2" for Stops.

DOORS:

FRAMES: { 4 Pieces 2" x 6" x 14' S—4—S for Head and Jambs
10 Pieces 2" x 6" x 10' S—4—S for Head & Jambs
2 Pieces 1" x 4" x 14' S—4—S for Cas'gs
12 Pieces 1" x 4" x 12' " " " " " "
160 Lin. ft. 1/2" x 1 1/2" x—4—S for Stops

DOORS: { 7 Pieces 1" x 4" x 14' S—4—S for Bat-tens
4 Pieces 1" x 4" x 12' S—4—S for Bat-tens
160 Bd. ft. 3/4" M. & D. Sheathing

CORNER CASINGS

1 Piece 1" x 4" x 12' S—4—S
4 Pieces 1" x 4" x 10' " " " "
1 Piece 1" x 3 1/2" x 12' " " " "
4 Pieces 1" x 3 1/2" x 12' " " " "

ROOF BOARDS:

1100 Bd. ft. 1" x 6" rough

SHINGLES:

12,500 3-Star Shingles—4" wide



Side Elevation Showing Doors Below the Windows—Scale, 1/8 In. to the Foot

2½ cu. yds. Finish Floor: 3" thick.
Portland Cement
Sand

10 bbls.
2½ cu. yds.

MIXTURES:

For Walls, Footings, and Floor Foundation
1 part Cement, 3 parts Sand, 5 parts Gravel.
For Finish Floor—
1 part Cement, 1½ parts Sand.

CARPENTRY

WALL PLATES: { 3 Pieces 4" x 4" x 16'
5 Pieces 4" x 4" x 10'
1 Piece 4" x 4" x 8'

POSTS: { 3 Pieces 4" x 4" x 8'

GIRDERS: { 1 Piece 4" x 8" x 14'
1 Piece 4" x 8" x 8'

STUDS: { 22 Pieces 2" x 4" x 16'
31 Pieces 2" x 4" x 14'
29 Pieces 2" x 4" x 12'
134 Pieces 2" x 4" x 10'

JOISTS

LOFT FLOOR: { 4 Pieces 2" x 6" x 14'
24 Pieces 2" x 6" x 12'

ROOF: { 58 Pieces 2" x 4" x 16'

TIES AND BRACES

13 Pieces 2" x 4" x 18'
7 Pieces 2" x 4" x 16'
20 Pieces 2" x 4" x 14'
3 Pieces 2" x 6" x 12'
4 Pieces 2" x 6" x 10'

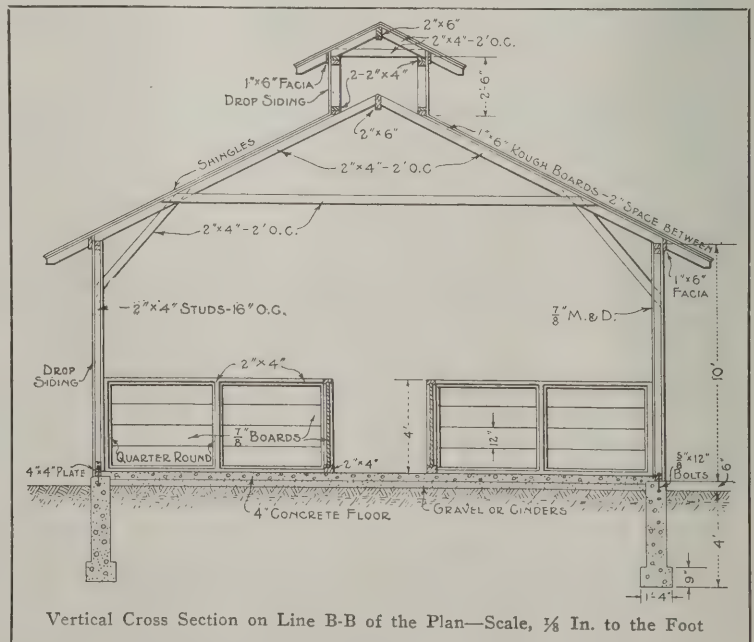
4 Pieces 1" x 6" x 16'
10 Pieces 1" x 6" x 14'
1 Piece 1" x 6" x 10'

RIBBON: { 2 Pieces 1" x 4" x 14'

DROP SIDING: 1600 Bd. ft. 1/2" stuff

FLOORING AND SHEATHING:

1800 Bd. ft. 3/4" M. & D.



Suggestions for Building a Hog House

PEN PARTITIONS:

- 19 Pieces 2" x 4" x 12' S—4—S
 18 Pieces 2" x 4" x 10' "
 58 Pieces 1" x 12" x 10' "
 1050 Lin. ft. $\frac{3}{8}$ " Quarter Round.

- GATES: { 11 Pieces 1" x 4" x 10' S—4—S for Battens
 120 Bd. ft. 1" x 6" S—4—S for Battens
 90 Lin. ft. $\frac{3}{8}$ " x 1 $\frac{1}{2}$ " S—4—S for Stops

FLASHINGS

70 Lin. ft. No. 26 gauge galv. iron—10" wide

HARDWARE

- (2) Doors 3' x 6'8" (1) Door 2'8" x 6'8"
 3 Pair 6" Tee Hinges
 2 only 6" Barrel Bolts
 1 only Hasp and Padlock
 (1) Door 3' x 3' (11) Doors 2'2" x 2'6"
 12 Pair 4" Tee Hinges
 (11) Gates 2'4" x 3'8"
 11 Pair 4" Tee Hinges

- (14) Windows—6 lights hinged at side
 14 Pair 3" Loose Pin Butts
 14 only Barrel Bolts 2 $\frac{1}{4}$ " long
 (8) Monitor Windows, hinged at bottom
 8 Pair 3" Loose Pin Butts
 8 only Transom Catches
 8 only Stop Chains 14" long
 1 Window Pole 12' long

The plans and specifications are those prepared by the I. H. C. Service Bureau, Harvester Building, Chicago, Ill., and the cost of the hog house, based on prices of material and labor in the state of Illinois, will approximate \$750.

The cost, however, will vary in different localities, depending on freight rates on material from source of supply and local labor conditions.

The figure given can be reduced by decreasing the dimensions or eliminating the concrete foundation, etc.

IMPORTANCE OF PAINT IN BUILDING CONSTRUCTION

What Constitutes Good Varnishing Material—Necessity of Steel Coating and Dressing—Paints for Special Purposes—Why Paint Streaks.



It goes without saying that paint is a prime factor in building construction, but every one does not fully appreciate the vital part which it plays in connection with all work of this character. Upon the quality of the paint very largely depends the life of the structure and where poor paints are used the rate of depreciation is correspondingly high. Much care and expert knowledge are required in the selection of paints and dressings for the particular requirements to which they are to be applied and the builder who is well posted on the subject possesses an important advantage in the line of business success. Builders and architects of the present day are confronted with innumerable brands and types of dressings, coatings and paints, many of which have a special use, says Allen E. Beals, in a recent issue of the *Record and Guide*. But owners of residences as well as those of skyscraping commercial structures complain of what they call the inferiority of many plastic surface coverings, although in most cases where complaint is heard regarding the wearing qualities of paints it is directly traceable, either to the fact that the architect or owner has not made his painting specifications sufficiently rigid, thus permitting painters to use their discretion in the selection of the materials or else they have gone into the market in a haphazard manner and have not carefully selected the kind of paint which would give the best service for the purpose.

Perhaps in no field of building construction has the tendency toward specialization been so acute as it has been in the paint market. To say that there are paints for almost every kind of surface or material used in building construction is, to-day, hardly an exaggeration.

Paints for Special Purposes

There is the paraffine coating for waterproofing stone work. There are the various kinds of cement floor covering. There are waterproof and dampproof dressings for steel. There is a lacquer for covering polished brass surface, not to mention the various dressings and coverings for hardwood and soft floors. And this does not include the various kinds of interior and exterior paints, varnishes, fillers, driers and stains.

Under the general heading of paint also could come

asphaltum, so it will appear to the owner, contractor and architect that instead of being merely an incidental in construction cost and consideration the subject of paint is one of the most important.

The first consideration of the man who has a painting job in prospect is the cost. It is not possible to give any table or formula for estimating painting costs. It depends upon the location of the job, the kind of surface to be covered, current cost of labor, the fluctuation and trend of the linseed oil and white lead markets, and also upon the kind of material chosen. In the case of suburban or residential painting, the surface to be painted varies. Most house paints are based on white lead or zinc. The cost of each may be estimated from the following conditions and sale of the ingredients that go to make up the body of the paint.

White lead, which is the principal element in good paint, is sold either ground, with a little oil forming a thick paste, or in powder form. One hundred pounds of white lead paste mixed in with five gallons of linseed oil will make approximately 6 $\frac{1}{2}$ gallons of paint weighing about 22 pounds a gallon. In other words, 15 pounds of paste lead and 6.3 pounds of oil equal 1 gallon which is equivalent to 7.7 pounds. Fourteen pounds of dry lead and 7 $\frac{1}{4}$ pounds of oil will produce 1 gallon of paint of very high quality.

One hundred pounds of white zinc and 8 $\frac{1}{2}$ gallons of oil will produce 10 $\frac{5}{6}$ gallons of paint. Twelve pounds of zinc and 1 gallon of oil will make 1.3 gallons or 9.5 pounds of zinc and 5.7 pounds of oil will make 1 gallon of white zinc paint weighing 15.2 pounds. Dark-colored paints which are made from iron oxides, ochres, etc., weigh from 12 to 14 pounds a gallon, but owing to the wide fluctuations in the weight of raw materials, it is impossible to give anything like exact figures.

Priming and Succeeding Coats

The number of coats of paint applied to surfaces is far from being an arbitrary matter. The priming coat is the first layer of paint applied to a clean surface. Good priming paint will consist of a gallon of the paint already described plus a gallon of raw linseed oil. This, of course, will be a very thin paint and should be used only in cases where it is applied to clean wood where the absorption will be very heavy. The first coat of priming should cover between 300 to 400 square feet on a wood surface, while a gallon of second or third-coat paint, well brushed out, will

cover about twice this surface. Priming coats are used for both inside and outside work.

For light-colored paints most painters prefer raw linseed oil to which a pale japan drier has been added. For dark colors, either this or boiled oil is used, the boiling having a tendency to darken the oil itself. On outside work, good white lead and zinc paints unquestionably give satisfactory service providing they have been well brushed out and have a good filler basis.

Other wood coverings give different effects upon surfaces. The oleo-resinous varnishes darken the wood, while the white shellac varnish keeps it more nearly in its natural color, although the latter does not prevent the natural darkening of light but merely retards it. Shellac varnish is the more expensive finish of the two if it is well applied. What is sometimes called oil finish generally consists in the application of a cheap varnish called hard oil, which is usually made of common rosin, linseed oil and benzine. Its chief merit is its cheapness.

Why Paint Streaks

One of the chief objections that architects find in the use of paints of various kinds is an uneven, streaky surface. This is due to the difficulty of getting thorough sand-papering or intercoat rubbing, even if so stipulated. A common practice in residential operations where wood is employed is to finish the living rooms in varnish and the kitchen and pantry with oil paints which are lighter in color and more easily renewed. The sleeping rooms, on the other hand, are done in enamel paints because color effects are desired to harmonize with the furnishings. The bathroom usually is executed in white, either in enamel paint or some special plaster coating which is impervious to sudden changes of temperature.

Different Paint Ingredients

Architects and builders should be familiar with the ingredients of paint. Besides the vehicle and pigment, paint sometimes contains volatile thinners, such as turpentine or benzine. A drier, in some form, is generally used in oil paints. This drier is a compound of lead or manganese, generally both, soluble in oil and is usually sold under the name of "paint drier" or "paint japan," as a solution of such material in a mixture of oil, turpentine and benzine. An addition of from 5 to 6 per cent. of this drier placed in raw oil paint will make it dry in from 6 to 12 hours, sufficiently to be handled. Paints, however, are not sufficiently dry to be used until they have been allowed to stand for at least three days.

No more than 10 per cent. of any drier or japan should be used in any paint. Slow drying paints are more durable than quick drying ones. For exterior surface painting, a mixture of two parts of lead and one part of zinc is much liked. Zinc-lead, however, is the name of an entirely different pigment made by calcining ores containing about equal parts of lead and zinc in which the lead is present as a sulphate. This pigment is free from the liability to turn brown if exposed to sulphate gases. But it is not so pure a white. It is a comparatively new pigment and because it is cheaper it is coming rapidly into use.

How Paints Are Adulterated

The adulteration of paints is a very serious matter and has become more acute of late because of the great advance in the price of linseed oil. These pigments may be adulterated with barytes or with terra alba, which is sulphate of lime, and sometimes with whiting, which is carbonate of lime. Carbonate of lime mixed with adulterated linseed oil constitutes most of the putty used in construction work to-day. These adulterants are powdered minerals. Barytes is a good pig-

ment as far as productive action goes and terra alba is thought by some good authorities to be unobjectionable; but whiting is unquestionably injurious. All of them are transparent in oil, and lessen the capacity or whitening power of the paint. To these white paints tints are added. Chromate of lead in white paint produces chrome yellow. The blue may be either ultra-marine or Prussian blue; and the green is chrome green, a mixture of chrome yellow and Prussian blue. The reds are, in house paints, made from coal-tar colors, and most of them are practically non-fading. Some dull yellow colors are made from ochres, which are clays tinted with iron oxides, roasted and ground. These are permanent colors.

The dark-colored paints may not contain lead or zinc at all. The deep yellows, greens and blues are made from the colors already named as tinting colors, none of which are entirely fast to light. The dark reds and browns are chiefly iron oxides, which are a valuable class of paints, very permanent on wood. The blacks are either lamp-black or bone-black, the latter sometimes called "drop black," and other carbon colors. These are frequently added in small quantities to obtain desired tones or shades.

It might be added that zinc and lead pigments have some action in oil, and in their case it is considered best to apply thin coats, but the dark pigments do not act in oil, and thick coats are best for durability. It might be said in passing that fillers are of two kinds, liquid and paste. The liquid filler is a quick-drying varnish often containing rosin varnishes loaded with driers and should not be used on high-grade work. Paste fillers are something like a very thick paint and are composed of some solid powdered substance, either silica or powdered quartz, mixed with a quick-drying varnish thinned with turpentine or benzine. This is applied to the dry surface of the wood with a stiff, short-bristle brush, or is put on with a clean, white cotton cloth and well rubbed into the pores of the wood. After half an hour or so the surface of the wood is wiped off with a wad of excelsior or a clean cloth or a piece of felt.

Owner of Building Unable to Prevent Mechanic's Lien

One section of the Georgia statutes provides that any person to whom a debt is due for labor or materials furnished and used in the erection or repair of a building, by virtue of an agreement with, or by consent of, the owner, shall have a lien, and another section provides that the owner, "other than the party by whom, or in whose behalf a contract for labor or materials has been made," may prevent any lien attaching by giving notice, etc. Held, that the owner referred to in the second section was not the same as the one mentioned in the first section, so that an owner with whom or on whose behalf a contract is made for the construction or repair of a building may not prevent the attachment of liens by giving notice.

The contract for erecting the 20-story Hotel Biltmore, which will form an integral part of the Grand Central Terminal Development and have 1000 rooms, each equipped with bath, has been awarded to the George A. Fuller Company, New York City. The amount involved is said to be \$5,500,000 and the work is to be completed by October, 1913. Warren & Wetmore, 70 East Forty-fifth street, are the architects and D. H. Burnham & Co., Chicago, are consulting architects. The structural steel will be furnished by the American Bridge Company.

A STAIRWAY OF UNUSUAL CONSTRUCTION

How a Peculiar Situation Involving a Flight of Stairs Was Met by an Expert

BY CHARLES CLOUKEY

THE seemingly simple things which turn out to be difficult when examined intimately are not so unusual as they are unexpected and the stairway illustrated by the drawings accompanying this article looks simple enough from the floor plan. There is not a thing unusual when looking at the elevation which is

The flight goes up regularly until it reaches the 12th tread, but here regularity ceases and the right-hand end of the tread is made $1\frac{1}{4}$ in. wider and the left-hand end $\frac{3}{4}$ in. narrower than its predecessor. The next two are the same and then come the winders.

A careful examination of the layout for the right-hand string will show that where the treads increase in width the nosing line falls below the true line of the rake and that while the top of the string is kept straight for purposes of convenience until it makes the drop for the winders, the nosings recede from the edge farther at each step.

Just the reverse occurs on the left-hand side, where the treads are narrowed, and from the point *b* to the intersection of the winders the nosings advance toward the edge of the string. In this case we increase the width of the string to hide the discrepancy. On the other side of the stairs the change is not so noticeable on account of the fact that a small increase in a wide space is more obscure than a small decrease in a narrow space.

There is nothing unusual about the regular winders except, perhaps, that the space from the treads to the nosings along the wall is filled with wood, as shown at the top of Fig. 1.

The next difficult thing is to find a place for the end of one string board, the ends of two treads, three risers and one nosing all to stand in the same vertical line. This part of the work was not set out by the

Another feature of the stair is the fact that it is sealed up under the highest part to give access to a window and also furnish a place for a work bench in the alcove thus formed, for this building is a garage below and a dwelling above. Fig. 2 gives some idea of how this is done and the irregular spaces under the winders are furred down to the straight ceiling line just above the little window.

Framing Window Openings

Generally these days if a man makes a weak point in a frame building it is to be found in connection with framing the window openings, says J. Crow Taylor. Some excellent houses have been seen that have been made weak enough here to cause sagging. It is partly due to the fact that there are many double and triple windows in vogue now and some of these window openings are rather large and the carpenter in charge of the work does not take into consideration the matter of weight and strains as he should. The general practice is to use a double header of two pieces of 2 x 4. This is good enough for single windows, but where there are large openings for double and triple windows it would be a much better plan to put a comparatively heavy beam across the top of the windows to help support the upper wall. Two pieces of 2 x 6 nailed flat together so as to make 4 x 6 makes a good top header, or if the opening is unusually wide 2 x 8 should be used instead of 2 x 6, especially if it is a side wall carrying joists and rafters.

Quite a lot depends on which wall of the house the openings are in. The end walls, where there are no joist ends resting, and probably an overhead joist to help support, makes a very easy place to frame in an opening and be safe, but in the side walls where both joist and rafter ends rest above and bring weight down upon them all openings should be heavily framed overhead.

It doesn't take much to support the windows. That is not the point. What you want to do is support the upper frame work and to do this you must study and consider the weight being carried above and frame accordingly even if it takes a beam of two pieces of 2 x 8 to make the header over a window or two pieces of 2 x 10. It is better and cheaper in the end to put it in the frame in the beginning than to have the building sag and spoil the job. Really an ordinary double header of two pieces of 2 x 4 is not much in the way of strength to carry a frame, especially when the header is simply toe nailed in.

A better plan than to toe nail in is to leave out doubling the studding along side of the frames until the headers are put in. Put up a single stud, then get the headers in and spike straight through, after which put in the extra stud for doubling and spike it, which gives a much better job than the other plan followed of toe nailing headers in window and door openings.

Building Operations in Amsterdam, Netherlands

The amount of building projected and under way in Amsterdam, the Netherlands, is breaking all records for that city, writes Consul Frank W. Mahin in his report to the Department of Commerce and Labor.

Opposite the Royal Palace, in the business center, several blocks of houses have been razed primarily for widening certain narrow and crowded streets, and also for erecting some new store and office buildings.

On the Prins Hendrik Quay 13 houses are being torn down to make room for a large building in which all the offices of the principal steamship companies operating from this port will be centered. The building will cover 1,674 square yards.

Amsterdam workmen and their families have here-

tofore been housed in apartments in four and five-story buildings, none having small separate houses. Now, however, a stock company has been formed to build workmen's cottages in the northern outskirts. Present plans provide for 52 dwellings and two store buildings, which may be enlarged if the enterprise is successful. The houses will be of two stories each, with separate entrances, designed for a family on each floor, and each house will have a small garden space in front and behind. There will be three rooms on each floor, but the houses will be so built that they may be enlarged. They will be electrically lighted and ready for occupants next spring. Presumably the rents will be low, as the company is operating more from benevolent than financial motives, and states that it will limit the capital return to 3 per cent.

Features of Early Building Construction in New York City

The rapid development as a commercial center of that portion of the city lying between Fifth and Sixth Avenues in the neighborhood of 42d Street, renders more than ordinarily interesting brief reference to some of the notable structures that existed within that zone a half century and more ago. One of the most striking of these was what was known as the Latting Observatory which stood on the south side of 43d Street on property on which is now rising the eight-story steel frame department store of Stern Brothers. This Observatory was the forerunner of tall structures in New York, as it is only in recent years that its height of 325 ft. has been exceeded. It was entirely of wood, cost about \$150,000 and was opened as an amusement attraction in 1853.

Its altitude was somewhat curiously divided, the first story being a refreshment parlor, and it, with the second story, was enclosed. Above this were three stories of open work, then an enclosed landing, where was located the first lookout, 125 ft. from the ground. Then came four open stories, above which was the second landing, 225 ft. above the street. The next three were open stories and then the third and highest landing, 300 ft. from the base. The tower terminated in a spire, topped with a flagstaff.

It was destroyed by fire 1856 and was one of the most spectacular conflagrations ever seen in the city.

Another feature of this section of the city was the Crystal Palace, which occupied a site in Bryant Park. Here was held a World's Fair which attracted to the place large gatherings of the people. This remarkable building was opened in 1853 and was destroyed by fire in 1858.

Some Reasons for Failures in the Building Trade

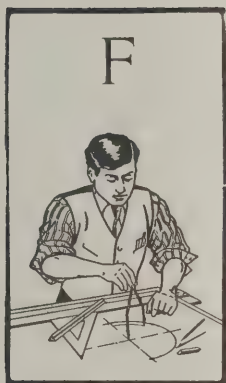
Some of the more common reasons for the failure of building trade concerns are pointed out in a recent paper by Leonard C. Wason, President of the Aberthaw Construction Company, Boston, Mass. Among these he mentions overhead charges, depreciation of plant, the lack of an accurate accounting system which would show the actual cost of the work performed in detail, and an extraordinarily weak judgment as to credits. The last seems to Mr. Wason to be an almost general weakness of the building trade. It has often been said that any one can get a building erected is he can only occupy a piece of land long enough so that a builder can begin operations.

It is reported that the historic building known as the House of Queen Berengère in the Quartier du Marais, Paris, will be taken down and rebuilt in America.

THE LEGAL LIABILITY OF ARCHITECTS

Scope of Duties to Owner—Degree of Skill Required —Obligations in Supervising Work

By A. L. H. STREET



FOR the purpose of determining the scope of an architect's legal duties to an employer, and of the liability for breach of such duty, a contract to prepare plans and specifications is to be distinguished from an agreement to superintend the construction of a building, in that a higher degree of fidelity is due the employer under the latter class of agreements. The general measure of an architect's legal obligation can be best summed up in the language of the Maine Supreme

Judicial Court in the case of *Coombs vs. Beede*, 89 Maine Reports 188, 36 Atlantic Reporter 104, as follows:

"The responsibility * * * is essentially the same as that which rests upon the lawyer to his client, or upon the physician to his patient, or which rests upon any one to another where such person pretends to possess some skill and ability in some special employment, and offers his services to the public on account of his fitness to act in the line of business for which he may be employed. The undertaking of an architect implies that he possesses skill and ability, including taste, sufficient to enable him to perform the required services at least ordinarily and reasonably well; and that he will exercise and apply in the given case his skill and ability, his judgment and taste, reasonably and without neglect. But the undertaking does not imply or warrant a satisfactory result. It will be enough that any failure shall not be the fault of the architect. There is no implied promise that miscalculations may not occur. An error of judgment is not necessarily evidence of a want of skill or care, for mistakes and miscalculations are incident to all the business of life."

Decisions of the Iowa, Michigan, and Wisconsin Supreme Courts to the same effect are found in opinions reported as follows: 34 Iowa, 290; 117 Mich., 638; 78 Northwestern Reporter, 62; and 43 Wis., 381.

In holding that a contractor could recover from the owner for the extra cost of a change made at the direction of a supervising architect to correct a mistake in the plans and specifications made by the same architect, the Nebraska Supreme Court decided in *Erskine vs. Johnson*, 36 Northwestern Reporter, 510, that the architect was probably liable to the owner for the amount of such increased cost. The fact that a chimney designed by architects proved inadequate, was held by a New York court in the case of *Hubert vs. Aitken*, 5 New York Supplement, 839, to entitle the employing owner to a deduction from their compensation of an amount covering the damages resulting from the inadequacy of the flue, but that the defect did not defeat all recovery by the architects for their services.

In the same case it was declared by the court that, in supervising construction, architects are merely bound to use reasonable means of observation and detection, such as are customarily used by the profession; and that "an architect is no more a mere overseer or foreman or watchman than he is a guarantor of a flawless building."

But in a later case, 103 New York Supplement, 878,

the New York Supreme Court, Appellate Term, decided that where plans are grossly defective an architect is not entitled to recover for preparing them, as where dimensions were not noted on them; the figures and scales did not correspond and they were "full of omissions and inaccuracies."

Architect Not Liable

An architect was exonerated from liability though the actual cost of the building exceeded his estimate of the cost by \$185; his estimate being \$5500, in the case of *Bodine vs. Andrews*, 62 New York Supplement, 385; 47 Appellate Division, 595. However, there are several cases in which it is held that when an architect is employed to prepare plans and specifications and furnish an estimate of the probable cost or plans calling for a building not exceeding a certain cost, he cannot recover for services in preparing plans for a building which cannot be constructed within such limit.

The Illinois Appellate Court decided in *Stewart vs. Boehme*, 53 Ill. App., 463, that an architect was not responsible for unsatisfactory results from using a particular kind of material, if the same kind had been largely and successfully used in other buildings. This case involved a claim by the owner that the floors of a second story were not properly deadened. Somewhat in line with the doctrine that a clergyman cannot excuse profanity on the ground that it was used by him as an individual and not as a minister, it is held by the Louisiana Supreme Court, in *Louisiana Molasses Company vs. La Sassier*, 52 La. Annual, 2070; 28 Southern Reporter, 217, that when an architect after preparing plans and specifications for a building, becomes the contractor, he is liable for both plans and construction and cannot excuse defective performance as builder because of defects in the plans.

Obligations in Supervising Work

The legal principles which exact the strictest fidelity by agents toward their principals, so far as concerns the subject of agency, applies to contracts to superintend the construction of buildings, etc. This principle was recognized by the Missouri Court of Appeals in a case reported in volume 27 Missouri Appeal Reports at page 131, where it was held that employment to superintend erection of a dwelling house, required the architect to see that the work was done strictly according to agreement; and that it was a breach of trust for him to relieve the contractor from that obligation by buying material and hiring and discharging workmen for the contractor, thus preventing the owner from holding the contractor responsible for defective material and bad workmanship introduced or approved by the architect.

The Illinois Appellate Court decided in *Stewart vs. Boehme*, 53 Ill. App., 463, that a supervising architect need not see that every nail and spike is driven, but the same court held in the later case of *Lotholz vs. Fiedler*, 59 Ill. App., 379, that a supervising architect is bound to see that nails are not driven through pipes constituting part of the plumbing and that iron window weights are not substituted for lead ones. Failure of a supervising architect to discover that the builder, in constructing a porch roof, omitted to fasten mortised joints with pegs, did not make him liable, according to another decision. Under a holding of the Illinois Ap-

pellate Court in *Lasher vs. Cotton*, 80 Ill. App., 75, negligent acceptance by a supervising architect of imperfect materials furnished by the builder is as conclusive against the architect's right to recover for his services as though such breach of duty were fraudulent.

Deduction from an amount claimed by an architect for supervising services, on account of the cost of reconstructing the front of a building to conform to the original plans, was allowed by the Wisconsin Supreme Court, in a case reported at volume 137 Wisconsin Reports, page 169; and 118 Northwestern Reporter, 543, where he unauthorizedly directed the builder to make a change in the architectural design of the front. In *Newman vs. Fowler*, 37 New Jersey Law, 89, where a building was defectively constructed owing to joint negligence of the builder and the supervising architect, it was held by the New Jersey Court of Errors and Appeals that the owner could sue the architect alone without joining the contractor, and though part of the

money due the contractor was withheld by the owner. An owner's act in occupying a building before it was completed was held by the Illinois Appellate Court, in the case of *Hettinger vs. Beiler*, 54 Ill. App., 320, not to preclude him from counterclaiming damages for failure to properly supervise the work, when the latter sued for compensation for his services. And the Texas Supreme Court in *Pierson vs. Tyndall*, 28 Southwestern Reporter, 232, decided that the owner did not lose this right of counterclaim by making payments to the contractor on the architect's certificates, knowing that the work was defective. Architects engaged to complete a partly constructed building must use reasonable care to ascertain whether timbers already placed in the building have been properly fastened, according to the decision of the New York Courts in *Straus vs. Buchman*, 89 New York Supplement, 226; 96 Appellate Division, 270.

The matter of architect's certificates is left undiscussed here, being reserved as the subject of an independent article.

WORKMEN'S COMPENSATION LAW OF OHIO

Some Points Discussed by the Retiring President
of the Cleveland Builders Exchange

IN the course of a most interesting address made by retiring president J. C. Skeel at the recent annual meeting of the Cleveland Builders Exchange, he pointed out that among the matters of special importance directly affecting the building industry of the state and one to command close attention on the part of builders is the workmen's compensation law. In discussing the matter he said:

"As passed by the last session of the legislature, this law has not appealed to building contractors, largely because of the excessive rates fixed by the State Liability Board of Awards and the ability of contractors to obtain better terms for protection from the established liability companies. An effort is to be made to revise this law so as to make it effective and more largely operative. To do this, care should be taken to provide a measure that will be just and fair to all parties concerned and at the same time place no handicap upon the industries of Ohio in comparison with other states.

I am firmly of the belief that gradually a system of protection for workmen will be established with national scope so that there will be uniformity among the states, but until this is done the danger to individual states is threatening. A movement has been started to bring all the parties interested in this subject together for conferences previous to the assembling of the next General Assembly and with this I am in hearty accord.

"Our Exchange is on record for Workmen's Compensation, and has exerted every effort to explain the present plan to members. It is nevertheless a matter for individual decision as to what method is adopted. I would recommend that our members manifest continued interest in this subject, giving their best thought to the solution of the problem and co-operating in all possible ways toward the final enactment of a law that will be equitable and reasonable in its application."

Commercialism in Trade Schools

A controversy has developed in one of the public trade schools as to how far commercialism should be introduced into the curriculum. One faction maintains

that the school should be self-sustaining to as great a degree as possible by the utilization of the labor of the students. The other contention is that the real usefulness of the institution may be seriously crippled as a consequence of too much commercialism.

The question is not a new one. Engineering schools have had to contend with it, and have reduced the problem to what may be termed a compromise position. A certain amount of commercialism is beneficial. In training a boy as a mechanic, for example, his environment should be one of usefulness. The knowledge that he is making something which is to be sold for practical everyday use produces far better results than if he fashions something the only purpose of which is to develop and test his skill. He should be made to feel the impulse of a business establishment, with its methods of manufacture planned to reduce cost to a minimum in securing a given quality of product. The practical side of the work, in the broad sense of the term, should be made conspicuous.

On the other hand, the student of the trade school should also be well trained as to theory. While his position is analogous to that of the apprentice in a manufacturing establishment, his education should go beyond that point. Given a certain objective in a trade school, it should not be sacrificed to save the public funds any more than that of any other public school.

Fire Losses in the United States and Canada

According to statistics just compiled the loss by fire in the United States and Canada in the month of November aggregated \$16,172,300 as compared with \$18,680,000 for the same month in 1911 and \$16,407,000 for November, 1910. The fire losses in November of the current year were quite evenly distributed, the largest individual loss occurring at Montreal, where property valued at \$465,000 was destroyed.

There were 273 fires in November, causing an estimated property damage of \$10,000 or over in each instance.

The fire losses for the first eleven months of 1912 reached a total of \$207,353,000, as compared with \$211,614,400 for the first eleven months of 1911.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

Design Wanted of Carpenter's Tool Chest

From F. S., Grand Rapids, Mich.—Will some of the many readers of the Correspondence columns of the *Building Age* give me sketches of a good tool chest to hold all the various tools used by a carpenter. I would like sketches of a tool chest that is being used in a practical way and that gives satisfaction to the owner.

Framing a Hammer Beam Roof

From H. L., Moorestown, N. J.—Will some of the readers of the paper kindly give me a method for framing hammer beam roof, the span of which is 28 ft., the rise 15 in. to the foot and the timbers to be used 6 x 10.

Two Pieces of Rustic Furniture

From Matt Riley, Fish Creek, Wis.—I am inclosing photographs of two pieces of rustic furniture which may possibly prove of more or less interest to readers



Fig. 1—General View of the Work



Fig. 2—Another View of the Sideboard and Desk

Two Pieces of Rustic Furniture—Contributed by Matt Riley, Fish Creek, Wis.

of the paper. Some of the keenly observing readers may recognize the building outside which the furniture stands as having been illustrated in these columns a few years ago.

The dimensions of the sideboard shown at the left are 54 x 18 in. in plan and 49 in. in height. The center section has two adjustable shelves, while the shelves in the end sections are stationary.

All are faced on the outer edges with strips or slabs of birch—the material used throughout in the construction of both pieces.

The table part of the desk is 48 x 26 in. in area and 29 in. in height. The cabinet is 19 in. high, thus giving a total height of 48 in.

It will be noticed that slabs have been used to face up the rails and stiles of the sideboard door and parts of both pieces of furniture. The drawers and end panels of the desk are faced with birch bark. The

sawn lumber of the sideboard is stained brown; that of the desk is green and given a dull finish.

Mortar for Cobblestone Work

From Reader, Boston, Mass.—Will some one kindly furnish through the Correspondence columns the formula for mortar used in cobblestone wall work?

Answer.—As the author of the very interesting articles recently appearing in these columns on cobblestone work, Lawrence S. Keir offers the following comments to the query of our correspondent above:

For a first-class job I use a mortar composed of one part Portland cement and three parts sand. However,

if the stone are of good size and a goodly percentage of them are flat a good mortar can be made consisting of one part cement and four parts sand, provided the brand of cement is very fine and the sand runs evenly from fine to coarse. If these proportions are used care must be taken to mix well before and after wetting. It is always better to wet the mortar by sprinkling as other methods tend to wash a certain portion of the sand in the dry mixture free of cement.

Proper and thorough mixing is a most important point. A careful man can get as good mortar from a 1:4 mixture as the careless man will get with a 1:3 mixture.

For a cheap job where it is necessary to economize at every point, the walls may be laid in a mortar composed of two parts lime putty, 1 part Portland cement and 9 parts sand, or a mix of 1 part Rosendale and 3 parts sand may be used. If either of the above propor-

tions are used the wall should be pointed with a 1:3 Portland cement mixture.

When it can be had it is advisable to use New England plastering lime in preference to common lump lime. It is a superior article and the time saved in slacking it will more than offset the difference in price.

The coarse grades of sand usually make the best mortar for rough stone work, but of course they do not work so well under the trowel and some prefer a finer sand because the mortar is, as the masons say, "fatter."

Generally speaking there is little difference between a good stone mortar and a good brick mortar, but the mortar for stone work is never mixed quite so wet as brick mortar.

There should always be enough cement in a cement mortar to cover every particle of sand and leave enough over to properly coat the stones or other material bedded in it. The finer the sand the more cement needed.

Safe Load for Floor of a Small Hall

From Colonial, Va.—Please submit the following questions to Mr. McCullough in order that I may have the benefit of his advice:

What would be considered a safe load for the floor of a small hall 42 ft. 6 in. by 33 ft. 6 in. between walls? There is a stage 10 ft. wide and 33 ft. 6 in. long and 3 ft. high extending across one end of the hall. The idea is to use well seasoned North Carolina pine joists 2 x 12 in. in cross section, placing them 16 in. on centers, the span being 21 ft.?

Would a floor of the above dimensions be safe when the hall is filled to overflowing if the joists are sized

of the dimensions given is weakened if 2 x 10½ in. joist on a 21 ft. span are used in place of 2 x 12 in. joist. I quote from page 219 of the *Building Age* for April:

2 x 12 in.	21 ft.	1,440 lb. safe load
2 x 10 in.	21 ft.	840 lb. safe load

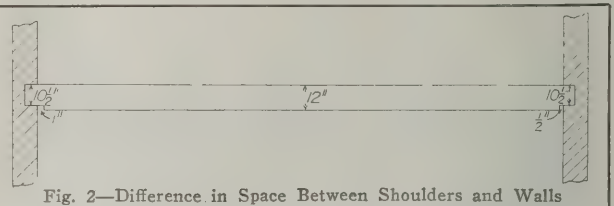
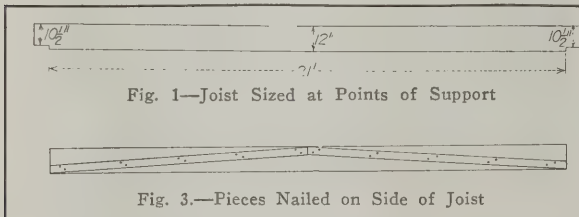
allowing 100 lb. for the ½ in. makes 940 lb. for the 2 x 10½ in. joist with a span of 21 ft. Say there are 50 joist 2 x 12 and with a safe load of 1,440 lb. the total is 72,000 lb.

Fifty joist 2 x 10½ in. on 21 ft. span gives 47,000 lbs., making a difference of 25,000 lb. Is the above correct?

Will strips nailed on the sides of the joist as indicated in Fig. 3 of the sketches add to the strength of the joist and have they any value in preventing deflection?

Answer.—In commenting upon the above questions Ernest McCullough says: To carry safely a load of people likely to congregate in a hall of the dimensions given by the correspondent his joists should be 3 x 14 in. for a span of 21 ft. and should be placed 12 in. on centers. It would do no harm to size the ends down to 10½ in. in depth as shown by the correspondent's sketch, if the work is carefully done and no chance given for a crack to start. Whether his 13-in. walls will be strong enough depends altogether upon their height. If more than 12 ft. high they should be 17 in. thick. The middle partition should be 2 x 6 in. on 12-in. centers instead of 16-in. centers in order to carry such a load safely.

I quite agree with the correspondent that to set a partition too high and then size the joist to fit is evi-



Safe Load for Floor of a Small Hall

to 10½ in. at the points of support as indicated in Fig. 1 of the accompanying sketches?

The building will be of brick; the outside walls 13 in. thick and supporting one end of the joist. The other end will be supported by 2 x 6 in. (placed 16 in. on centers) Virginia pine partition under center of the hall, making two spans of 21 ft. each.

The floor of the hall is to be Virginia pine 1¾ in. thick and the ceiling below is to be plastered. Will it be necessary to use 3 x 12 in. joist in order to eliminate any doubt as to the safety of the floor? The hall will be used for religious services, church and school entertainments, but not for dancing and political meetings.

To me the sizing of joist is evidence of incompetency and all cases of the kind I have ever seen is where careless workmen have built partitions too high and sized the joist in order to bring the floor to its proper level. I have worked for architects from Boston, New York, Chicago and Washington, and all with whom I have had dealings would not tolerate it under any circumstances. I have never seen a case where it was necessary to size joist on new work.

It is evident that joist sized as shown have a chance to crack and there is nothing to prevent it, for there is always ½ in. to 1 in. between shoulders and walls as shown in the sketch, Fig. 2. Again, these are not 12 in. joist, but 10½ in. and have the strength of 10½ in.—no more, no less. That is my way of understanding it.

What I would like to know is to what extent a floor

dence of incompetency. He says, however, that to size the joist at the ends reduces the depth of the joist. He should know that in all cases the depth of the joist is the depth at the mid-span where the full bending moment is exerted. The effect varies toward the ends of the joists in proportion to the ordinates of a parabola; that is, at the quarter span points the bending moment is three-fourths the bending moment in the middle and at the ends where the joist rest on the supports the bending moment is practically zero. Consequently we design for the full depth in the middle and at the quarter-span points. The joists will be strong enough if they are only half the middle depth at the supports.

The reason for requiring at least half the depth at supports is to provide material to take shearing stresses. Beams made of cast iron are usually in the form of a parabola to economize material. The reason such forms are not used for wood is because of the danger of the wood splitting. For ordinary cases a very careful sizing for a few inches on each end for a depth not exceeding 1/5 of the mid-depth, will seldom be harmful, although it should be avoided when possible for fear of causing cracks in the timber.

With regard to the difference in load carried by a beam 10 in. deep and one 12 in. deep it may be stated that the load varies with the square of the depth and not directly with the depth. For example, if a 12-in. beam carries 1440 lb. and a 10-in. beam carries 840 lb. the difference is not as 12:10, but varies as

$$12 \times 12 = 144 : 10 \times 10 = 100.$$

Thus a 10-in. beam might carry 840 lb., but the 10½ in. beam will not carry 940 lb., as he figures by direct proportion from a 12-in. beam. Let him make the following proportion:

$$10 \times 10 = 100 \text{ and } 10.5 \times 10.5 = 110.25.$$

$$100 : 840 :: 110.25 : 926 \text{ lb.}$$

In his example the correspondent makes it 940.

I fail to see where he will help his building by deciding to use it for religious services, church and school entertainments and *not* for dancing. No city building ordinances make distinctions so finely drawn. The usual requirement is for 150 lb. per sq. ft. for halls for public gatherings, no matter of what nature, and 200 lb. per sq. ft. for drill halls, as the regular step of marching men is liable to start dangerous vibrations.

The effect upon a floor of dancing is less than that of a crowd, for the floor is not packed with dancers as it is with an audience. No matter what the designer might intend the fact remains that if the owner of a hall in which church and school entertainments may be held, is approached on the subject of renting it for political meetings or dances, he is likely to rent it for any purposes for which the people may want it.

Nailing strips on the side of the joist as shown in Fig. 3 of the correspondent's sketches is an old-fashioned custom rapidly going out of style, as it does no good and is wasteful of material and labor. It is not permitted in cities having building ordinances.

The load of a moving crowd is a serious thing and a 21 ft. span is a long one for joists. To keep within proper limits of deflection the depth in inches should be not less than two-thirds of the span in feet.

For a 21 ft. span, this calls for 14 in. joists. The wood proposed to be used is assumed as strained to 1000 lb. per sq. in. in bending. Then we have the following loads per sq. ft. of floor with different sizes proposed by "Colonial," the span considered being clear span.

Sizes of Joists and Spacing in Inches.	Span, Ft.	Load per Sq. Ft. of Floor, Lbs.
3x14 —12	21	150
3x14 —16	21	115
3x12 —12	21	115
3x12 —16	21	83
2x12 —12	21	74
2x12 —16	21	57
2x10½ —12	21	57
2x10 —12	21	52

The correspondent may vary the above loads according to fiber stress if he wishes. The fiber stress for these loads being 1000 lb. per sq. in. he can use 1500 lb. fiber stress and add 50 per cent. to the loads, thus making the loads vary in direct proportion to the allowed fiber stress. The loads above given are total loads.

The weight of such floors will be close to 25 lb. per sq. ft. counting joists, bridging, flooring, plaster, etc., so if this amount is deducted from the above loads per sq. ft. the live load is light. The correspondent can see that while most city ordinances call for a live load of 150 lb. in using 3 x 14 in. joists on 12 in. centers he is really getting a live load of only about 125 lb. per sq. ft.

Plans Wanted for an Octagon Barn

From J. G., Kenton, Tenn.—I have been a subscriber to the paper for some years and I now come to the practical readers of the paper for plans and specifications of an octagon barn not less than 60 ft., nor more than 72 ft. in diameter. I want a corn crib in the center and a hay loft above. I want the drawings to show how to get to the crib with a wagon and how to get hay in the loft with hay carrier and track without constructing a gable in the roof.

A plan of a barn of this character will be greatly ap-

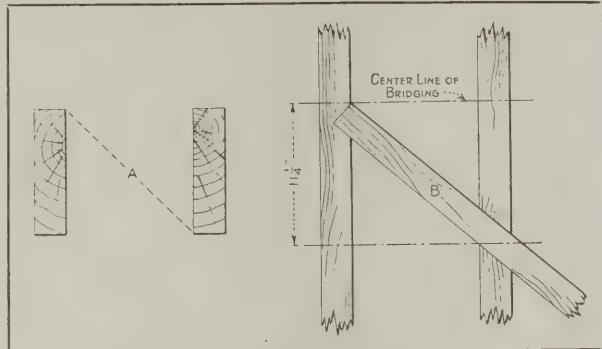
preciated by me and I have no doubt that some of the other readers will be interested as well as myself.

Cleaning India Oil Stones

From D. P. B., Redford, N. Y.—I would suggest to "P. M. H.," Sedalia, Mo., who asks in the November issue of the paper how to clean India Oil Stones, that he heat his oil stone very hot or steep it in boiling concentrated lye. Heating in an oven is also good.

Cross vs. Solid Bridging

From Hollings, New York City.—Having met quite a number of carpenters who did not appear to know whether cross or solid bridging was the best, I present the following explanation of the two methods which



Cross vs. Solid Bridging

may possibly be of interest to some of the readers of the *Building Age*.

Suppose, for instance, a floor of beams 3 x 12 in. is bridged with solid bridging, each of the beams will shrink ⅛ in. in thickness, thus making each piece of bridging that much shorter, and, of course, worthless as bridging. Now if a beam 3 x 12 in. shrinks ⅛ in. in thickness it will shrink ½ in. in depth, consequently the distance from the inside top corner to the inside bottom corner of the adjoining beam as shown by the line A in Fig. 1 of the sketches would be shorter after shrinking than before, so that the more the beams shrink the tighter the cross bridging becomes. It is for this reason that cross bridging is kept a short distance from the top and bottom of the beams so that when the beams shrink the end of the bridging will not push the floor up or the ceiling down.

The lengths and bevels for cutting cross bridging can be easily obtained in the following manner. After snapping a line across the beams for center of bridging, snap a second line for beams of this size at a distance of 11¼ in. Lay the material for the bridging across the beams as shown at B in Fig. 2 of the sketches. Draw lines on its under side along side of each beam; then turn it over and saw to the lines.

This method is useful where, for some reason, the beams are not equally spaced as is sometimes the case.

Winding Stair Rails

From C. C. Grant, Red Deer, Alta.—In the December issue of the paper "C. F. S." of Brooklyn, N. Y., endeavors to prove that the plank of the tangent system is thick enough to contain a helical blank. The demonstration is general and hence if true must be true for all sizes of rails or blanks.

Suppose the blank be reduced in size until it becomes a line, the plank of the tangent system would in that case be reduced to a plane without any thickness, which plane "C. F. S." terms the center line of the plank. He shows in Fig 5 that the center line of the blank does not coincide with the center line of the plank and claims

that $2-x$ and $4-x$ of his Fig. 1 are the distances between center line of rail and center line of the plank.

This according to the demonstration proves that the plank must have some thickness but it has no thickness according to the tangent system as pointed out above; that is, "C. F. S." proves that the plank of the tangent system is not thick enough, which is exactly the opposite of what he claims to have proved.

If he will look over his work, taking nothing for granted, he may be able to undeceive himself, or if he will look at the article of "Triangulus" in the issue of the *Building Age* for April, 1912, or if he will try the experiment suggested by me in the November issue of the paper, he will be undeceived if he wants the facts.

The contention is that not one single thing in connection with the tangent blank is correct. The fact that the tangent plank is not thick enough to contain a proper blank is only one of the many errors of the tangent system.

Plans for Wayside Inn

From D. P. Barry, Redford, N. Y.—If the correspondent signing himself "J. C. B.," Mich., would tell us about how much he expects to put into his Wayside Inn and about how many guests he expects to have for a general run, I will be glad to send the *Building Age* an elevation and floor plans which may be of interest. I have one ready now, but I may have to modify it somewhat to suit his purposes.

In this state hotels and inns are governed by the same laws.

Preventing Tools from Rusting

From A. V. B., De Pere, Wis.—Can any of the readers tell me through the Correspondence columns what is the best oil or preventive to keep saws and other carpenter's tools from rusting?

Answer.—There are various methods of so caring for bright tools as to prevent them from rusting, these being governed largely by the individual preference of the carpenter. One mechanic who has worked with tools for 20 years says he has never found anything better for them than common lamp oil; another makes use of one part coal oil and two parts best lard oil, well mixed together; still another recommends a mixture consisting of a pint of linseed oil, one ounce of beeswax and one ounce of tallow, heated until the wax and tallow are melted. It is only necessary to rub the tools well with this preparation in order to secure satisfactory results. Still another recommends sperm oil with a very little coal oil to cut it and well mixed together.

Professor Olmstead's method for the preservation of scientific apparatus consists of slowly melting together 6 or 8 parts of pure hog's lard and one part resin and stirring until cool. This remains in a semi-fluid condition and always ready for use. The resin tends to prevent rancidity and supplies an air-tight film. A little of this rubbed on a bright surface will effectually protect and preserve the polish.

Some carpenters make use of vaseline for keeping tools bright; others use kerosene, and still others find nothing better than fine olive oil put on very thin and then wrapping the tools up in strong tissue paper coated with oil.

With all this said, however, we shall be very glad to have our practical readers describe their methods of keeping tools from rusting.

More Correspondence Wanted

From H. F. T., Winona, Minn.—For several years past I have been a careful reader of the paper and am free to confess that I have learned more from the Cor-

respondence Department than I have from all the books in my possession treating on carpentry and building and I have several to which I lay claim. I desire to say to the readers of the *Building Age*, and especially to those interested in the Correspondence Department, that I should like to see more questions and answers in that portion of the paper devoted to this department.

Let us all see if we cannot ask and answer more questions; give a greater number of plans and suggestions and discuss many things which occur in our every day business experience. During the long winter evenings now at hand we shall have plenty of time and can give the various matters brought out in the Correspondence Department such attention as will enable us to properly express our views. Each one is likely to have some good ideas that will prove valuable to other readers of the paper and I would urge that no one be backward in writing to the Editor. It is our fault if we do not make the columns of the Correspondence Department interesting. Let us all make an extra effort this winter.

Note.—The suggestion of our correspondent is certainly a good one and voices the wishes of the Editor with regard to this matter. The Correspondence Department is one of the most valuable features of the paper and is designed for giving the readers an opportunity to express their opinions regarding various subjects of trade interest; to discuss matters which come up in the execution of practical work and to ask and answer questions in which they are especially interested. We trust therefore our readers will heed the suggestion of "H. F. T." and during the long winter evenings send the Editor a great deal of interesting matter. If each reader will take it upon himself to send only a single communication the Department can be rendered more valuable than ever before.

Knot for Sash Cord

From Carpenter, Sheridan, Wyoming.—I would like to ask through the columns of the paper what kind of a knot is the most lasting for a sash cord.

Value of *Building Age* to Its Advertisers

From Louisville Cornice & Roofing Company, Louisville, Ky.—Some few weeks ago we received an inquiry from New Zealand from an architect down there, on our bar seats. The only way that we can enlighten ourselves as to how he was aware of the fact that we were manufacturing these seats, was from the article that you published in your paper some few months ago, telling of our invention.

From the wording of his letter and from the wording in your article we put the two together and naturally come to the conclusion that this architect must have received your valued publication and wrote to us. This is only an instance showing the value of your paper and how widely it is read throughout the civilized world.

Hanging Three-Butt Doors

From C. R., Appleton, Wis.—I come to the Correspondence columns of the paper for the opinion of practical mechanics in the trade concerning the correct method of placing three butts or hinges on a door. I place the upper butt so that there is a space of 7 in. from the top of the door to the top of the butt and from the bottom of the lower butt to the bottom of the door there is a space of 11 in. I then take the center butt and place the top of it at the center mark.

While this is my method of placing butts on doors I am desirous of learning the plan adopted by others and if there is any rule governing such matters.

Stacking Lumber

From O. B. M., New York City.—Among the many details of a carpenter and builder's business there are perhaps none more important than the proper care of materials, and as being of possible interest to the many readers of this journal I present for their consideration two methods of piling or stacking lumber—either finished or unfinished, such as planks, flooring, etc. Much has been published on this subject in the past, yet I feel sure the methods here advocated will appeal to many connected with this particular branch of business.

By referring to Fig. 1 it will be seen that in the pile to the left the pieces are stacked in the usual edge to edge manner with the exception that every sixth layer is omitted and replaced by a single piece set diagonally from corner to corner, while broken or short pieces are laid across the ends to keep the layer or course immediately above it level.

The pile can either be built up in this manner or

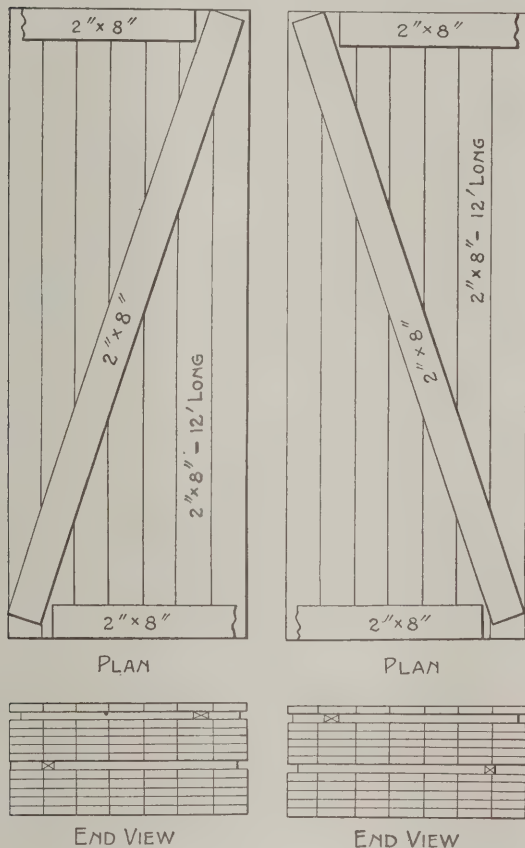


Fig. 1—Plans and End Views of Piles of Lumber

Stacking Lumber as Suggested by "O. B. M.," New York City

reversed every sixth tier as represented by the plan and end view at the right hand in Fig. 1. Of course, it is not necessary to confine the laying of the diagonal pieces to every sixth tier but this must be regulated by the width of the stuff—narrow material such as 2-in. or 3-in. flooring or strips requiring more frequent bonding than is the case with wide boards or planks. The scheme however is economical as the pile of lumber can be built up rapidly while giving full opportunity for the admittance of air while preserving the form and affording thorough seasoning.

In Fig. 2 of the sketches is shown an excellent method of stacking wide stuff. Here $\frac{1}{4}$ to $\frac{1}{2}$ in. should be left between the edges of the pieces to admit of the circulation of air from each end.

Fresh kiln-dried lumber should never be stacked in a newly plastered building as it is damp and the pores and interstices of the woody fibers being agape will absorb the moisture prevalent in the atmosphere on

each floor. Each piece will there expand and then shrink either when the heat is turned on or with the advent of warm weather, which will dry out the plastering. The results will be anything but satisfactory.

Constructing a Canvas Roof

From R. H. R., Portland, Ore.—I notice with some little interest the inquiry of "C. C. H.," Brookville, Pa., which appears on page 536 of the October issue of the *Building Age*, this interest growing out of the fact that there are a great many who make a failure in the use of canvas as a waterproof covering for decks. Now, I would suggest to "C. C. H." that he go to the different dealers and obtain a few samples of 10 oz. canvas; cut them all to exactly the same size; mark each one for identification, making a memoranda in which the price of each is noted, and after drying them thoroughly so as to drive off all moisture, take them to a druggist and have them weighed on accurate scales. When this has been done, make a note of the weights of each on the memoranda in question. Soak and rub in water to remove all starch or filler, and after thoroughly drying again, weigh each piece, noting the weights on the memoranda. By this means the correspondent may be able to determine which is the best canvas for the money.

After making a choice, take a small piece of the canvas, a foot or so square; dry thoroughly and tack it to a smooth surface, constructed the same as the deck which it is desired to cover (which, by the way, should be covered with $\frac{7}{8}$ x 4 in. or $\frac{7}{8}$ x 6 in. tongued and grooved stock dressed on the upper side) stretching it as tight as possible so that it will be perfectly smooth.

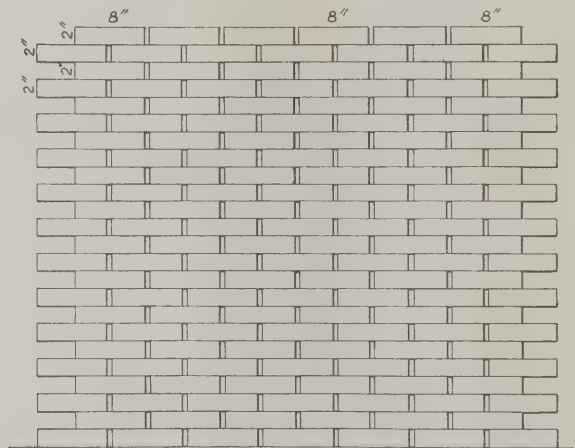


Fig. 2—Method Suggested for Stacking Wide Stuff

Now, wet it thoroughly and notice that the meshes in the canvas become larger as the threads draw tight, allowing water to run through it like a sieve.

When in this condition, paint it with a good coat of white lead and linseed oil which will pass through the meshes of the canvas and cover the under side. The water will not mix with the paint but will evaporate before the paint dries, allowing the threads to dry and swell into the soft paint, so that when the latter is practically dry, every thread will be embedded in paint with very little on the upper surface.

After this process has been completed, give it two more coats of paint, allowing one to thoroughly dry before the second is applied. This will complete the covering and render the deck perfectly waterproof. The canvas should never be allowed to dry too slowly or laid in wet weather, as it is liable to cause mildew.

If a first-class roof is desired, I would recommend two layers of 10 oz. canvas, both layers to be put down

as described above. If only one layer, however, is found desirable, use 14 oz. canvas or better. It is preferable to use narrow widths of canvas as they are easier to stretch than a wide piece. Seams should be lapped 1½ in. and tacked every inch.

From E. E. H., West Hartford, Conn.—I noticed in looking over the October issue of the *Building Age* that "C. C. H.," Brookville, Pa., asks for some information about using canvas as a roof covering and that a large portion of the roof is to be made into a roof garden, the floor to be something like the deck of a boat. In regard to this matter I would say in the first place that if he had given us the dimensions of his Dutch or gambrel roof it would have been much easier to tell him how to do the work. The joist should pitch from the center ½ in. to the foot; boats pitch ¼ in. to the foot, but then they are always in motion.

In regard to the floor for the canvas, place the joist 16 in. on centers; cover with matched sheathing or any kind of flooring; paint the floor with one coat of white lead and when not quite dry put on the canvas. I would state that the canvas should have been previously wet and dried so that it might shrink all that it was likely to do.

Put on one thickness of any heavy canvas and paint with two coats of white lead. Tack the canvas at the joints with copper tacks placed 2 in. apart and ½ in. from the edge.

If "C. C. H." wishes to put up a pipe frame of iron for a canvas roof he can place a block of wood the size of the base of the frame to which to bolt or screw it. Then he can put the canvas around the irons, and then finish with elastic cement or slater's cement.

Recipes for Frosted Glass

From English, Camden, N. J.—I would be glad to have a simple method of frosting glass so as to make a satisfactory job.

Note.—There are various methods of accomplishing what our correspondent desires, and some of these taken from the *Cyclopedia of Formulas* may not be without interest in this connection.

1. Clean the glass thoroughly and moisten with hydrofluoric acid. When sufficiently frosted wash thoroughly.

2. Rub the glass over with a little bag of muslin filled with fine sand, powdered glass or grindstone grit and water. Some sand may be placed directly on the glass in order to more quickly accomplish the desired effect.

3. Make a saturated solution of alum water and wet the glass with the liquid, maintaining the glass in a horizontal position so that the solution will not run off, for the more slowly it is cooled the more satisfactory the results. If desired, the alum solution may be colored with cochineal and, of course, the more solution used the thicker will be the crystals.

If our correspondent simply desires a temporary frosting, he can mix together a strong hot solution of Epsom salts and a clear solution of gum arabic, applying when warm. Another way is to use at a warm temperature a strong solution of sodium sulphate and when cool wash with gum water.

In this connection it may be interesting to suggest to this correspondent how he may ornament the frosted glass should such a treatment be desired. It is only necessary to choose some acceptable pattern of, say, lace curtains, lay upon thin paper and with a pencil trace the outlines. After making as many layers as he requires patterns, cut out all the designs at one time by cutting through several layers of paper with a pair of sharp scissors. Fasten the pattern with tacks to the

frame around each pane of glass it is desired to decorate. Tie up a piece of putty in a piece of thin muslin, leaving enough of the latter to hold instead of a handle. With this dab all over the part of the glass which the pattern leaves bare. When the pattern on the glass is dry remove the paper and varnish the glass.

Material Required in Laying 1000 Bricks

From W. F., Denver, Colo.—It has frequently occurred to me that a subject of deep concern to the general readers of the *Building Age* might be profitably discussed by those who are interested in the various branches of building, and at the same time lead to a comparison of methods adopted by such tradesmen to reach the approximate amounts of materials required in their separate branches of building. To meet such comparison, a series of questions should be published under the head of "Correspondence" treating the several subjects, these questions to be answered by readers who are men of building experience, and the answers be published for general information.

The subjects to be treated should include brick work of various kinds, concrete floors, footings, walks, rubble stone walls, ashlar, pointing, etc., plastering, including scratch coat, brown coat and plaster of paris hard finish; also the treatment of patent plastering material.

As a leader, I have prepared a few questions on brick work and respectfully invite readers interested to submit their methods and experience.

How much material will be required for laying 1000 bricks under the following conditions:

1. Common bricks in ordinary wall, lime mortar, lime and sand only.
2. Common bricks in heavy walls, cement mortar, cement and sand, but no lime.
3. Common bricks in heavy walls, cement, lime and sand.
4. Face bricks in white mortar, lime and sand.
5. Face bricks in cement mortar, cement and sand only.
6. Face bricks in red mortar, lime, sand and mineral.

In giving answers state the proportions of lime, sand, cement, mineral, etc., necessary to make the required amount of mortar to lay 1000 bricks; also state experience and best method of preparing the mortars.

7. In making white mortar for face work, is it best to use quicklime putty and mix sand when putty is cold, or mix the sand as soon as the lime is run off and while hot? What kind of sand should be used for white mortar for face work?

8. In making red mortar for face work, is it best to add the mineral to brown mortar, or slack the lime and set for putty and then add the mineral and when well mixed add the sand?

I trust these questions will draw out answers which will be of benefit to every one interested in building.

Note.—The questions of our correspondent open up an excellent field for valuable discussion, and we invite a full and free expression of opinion.

Chapel and Vaults for Country Cemetery

From A. A. B., Plantsville, Conn.—I would like to get some ideas for a small and convenient chapel and vaults for country cemetery of brick or cement blocks and to cost about \$2,000. Any information or suggestions which the readers may furnish through the columns of the Correspondence Department will be greatly appreciated.

CORNICES FOR TILE AND STUCCO HOUSES

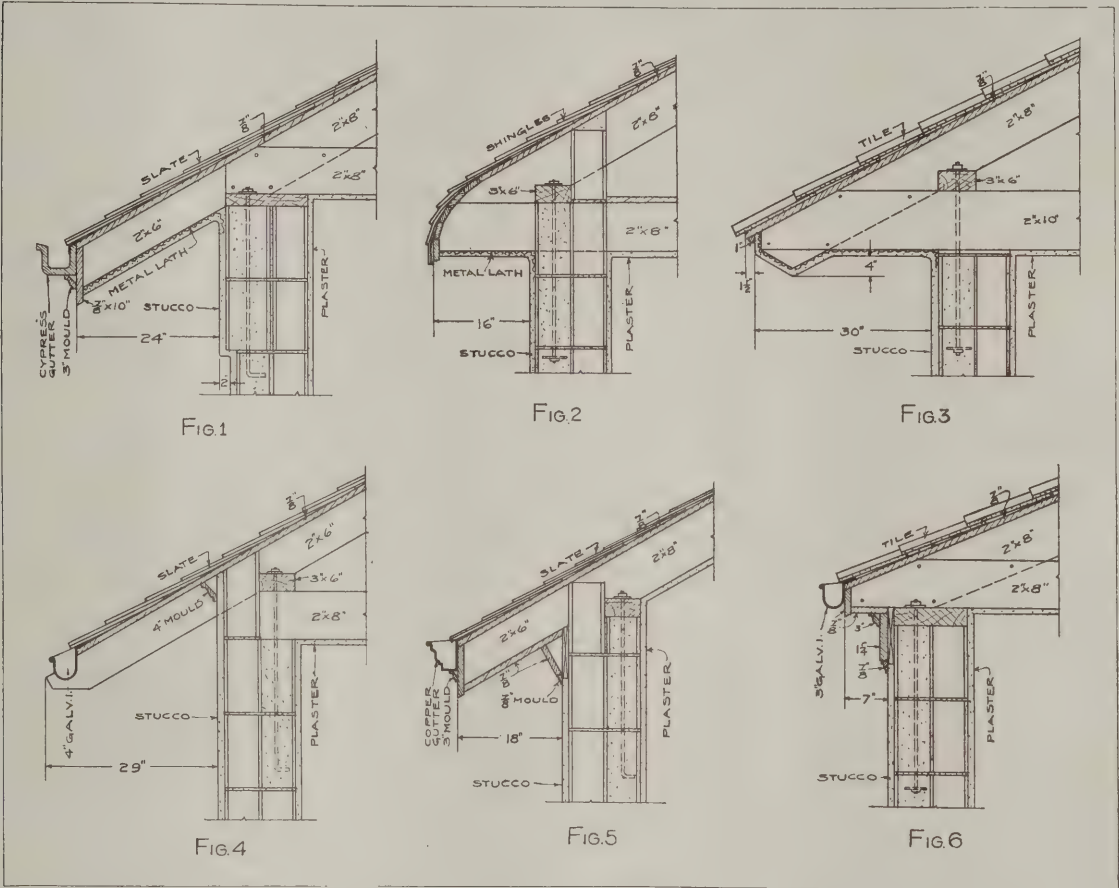
Various Forms of Cornice Construction Especially Suited for Houses Having Exterior Walls of Hollow Tile and Stucco

By JOHN S. EDMUND

THE rapidly increasing use of hollow tile and stucco finish for the exterior walls of modern homes renders particularly interesting some forms of cornices designed especially to meet the requirements of houses of this character. In the designing of a house or in

nailed to the extending wooden rafters, all as clearly shown in the sketches.

In Figs. 4, 5 and 6 are sectional views of wooden cornices. Here the wood work can be finished to suit the preference of the architect or the owner, and no



Figs. 1, 2 and 3—Designs of Cornices Where the Soffit is Covered with Stucco Applied to Metal Lath. Figs. 4, 5 and 6—Designs for Wooden Cornices

Cornices for Tile and Stucco Houses .

fact of any building some of the first things that must be considered are the details. In viewing the various features to which attention must necessarily be given there is probably no more important detail in connection with the exterior of a house, or one that can add more to or detract from its artistic appearance, than the cornice. A correctly designed cornice adds a remarkable degree of refinement and helps to set off the building to great advantage.

The first thing that must be considered in the detailing of the cornice is the proportioning of it in regard to the relative height and size of the structure and second details that will correspond with the rest of the exterior finish. The details illustrated upon this page represent various methods for the construction of cornices where hollow tile and stucco have been used for the exterior walls.

The specimens represented in Figs. 1, 2 and 3 are intended to have the soffit of the cornice covered with stucco. The latter is carried on metal lath which is

doubt many hints of suggestive value for the designing of other cornices may be derived from a careful inspection of them.

One of the notable features of the new building now going up at the corner of Broadway and Liberty Street, New York City, for the Guaranty Trust Company, is the wide unobstructed floor space. Running the full depth of the building on the middle line in the first, second and third floors will be a clear space 51 ft. wide. The second and third floors over this space are supported on heavy plate girders 33 in. deep and placed 17 ft. apart. The fourth and fifth floors are suspended from six transverse trusses, which also carry the sixth and seventh floors and support on their top chords the columns for the eighth floor attic and roof.

The entrance door of one of the churches in Rome is said to be so ancient as to make it the oldest wooden door in the world. The church was built in the year 425.

ESTABLISHED 1879

THE BUILDING AGE

Formerly CARPENTRY AND BUILDING

Copyright, 1912, by David Williams Co.

Entered at New York Post Office as Second Class Mail Matter

Published Monthly by the

David Williams Company
239 West 39th Street New York

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I. A. Mekeel *1st Vice-President*
Fritz J. Frank *Secretary*
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Subscription Rates: To all parts United States and Mexico, \$1.00 a year; to Canada, \$1.25 a year; to all other countries, \$2 a year.

January, 1913

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Pittsburgh's Cement Show

The Cement Show which has just been opened in Pittsburgh and is in progress as this issue of the paper goes to press is the first ever held in that city. It was opened under most auspicious circumstances, and an idea of the interest manifested may be gathered from the statement that more than 250 exhibits are arranged over the floor space of the main exhibition hall of the Exposition Building, these covering numerous phases of cement work and appliances pertaining thereto. Many of the displays are of a particularly interesting and instructive character, showing as they do what is being accomplished in the way of cement construction, both for building and other purposes. A town constructed entirely of concrete, reproducing an actual community recently established, is shown in miniature, while a model of another village of poured concrete houses erected in accordance with the ideas of a well-known Washington architect is highly educational in its nature. It is worthy of remark that in Pittsburgh is located the largest cement works in the world, while in that city the Larimer avenue bridge is the largest concrete span in America and lacks only 3 ft. of being the largest span in the world. At this Cement Show the government is an important exhibitor, occupying a number of booths and demonstrating much that is of interest to even the casual visitor. The exhibition as a whole is of unusual interest to architects, builders, contractors, engineers and prospective home owners, and judging from the attention given the various exhibits by those in attendance at the opening of the show it will result in creating an awakened interest in cement construction and all that pertains thereto.

A Curious Building Situation

One of the curious features of the building situation in New York City and one which in a measure may be regarded as somewhat paradoxical is that there are more structures torn down on the island of Manhattan than are erected, and yet building operations show a steady growth. This condition is evidenced by the fact that in 1911 there were, according to Superintendent Rudolph P. Miller of the Bureau of Buildings, 1078 permits issued for the demolition of buildings, while the permits for new structures numbered 840. As regards the number of new buildings the operations for the year just closed will show a decrease, it is estimated, of something like 5 per cent., as compared with the year before, but against this decrease of 5 per cent. in the number of new buildings must be placed an increase of 15 per cent. in the value of the improvements. It may be stated that in the last six years the cost of new buildings in Manhattan has increased practically 100 per cent., which means, according to Superintendent Miller, that the tendency in this Borough is toward fewer but larger and more expensive buildings. As illustrating the point that more structures are torn down than are erected it may be stated that sometimes 20 to 30 houses are demolished in order to make room for one mammoth structure of steel, stone and concrete. Mr. Miller regards the 100-story skyscraper

as a possibility, but not a probability under present conditions, the principal obstacle to the increase of altitude being the congestion of transportation. In high buildings the expansion of elevator facilities deadlocks with the necessity for floor space. For this reason a very tall building on a narrow lot is hardly an economic success. In the opinion of the authority mentioned 30 stories as a rule is the economic height of a building in New York City, while in smaller cities 12 and 15 stories is the economic limit. Touching the number of buildings on Manhattan Island that are more than 16 stories in height, a careful inspection of the statistics available shows the number to be 150 and those of 10 stories and over are a few more than a thousand. In the year 1911 there was 83 per cent. of the new construction fireproofed and the year just closed will show an increase. The fire prevention problem in skyscrapers is met by a series of water tanks and pipe systems at various levels, while artificial light and artificial ventilation by means of filtered air have disposed of some of the other skyscraper problems.

Coming Conventions

The National Builders' Supply Association will hold its annual convention in New Orleans, La., January 15 to 18, when upwards of 200 delegates are expected.

The twenty-eighth annual convention of the New York State Master House Painters and Decorators will be held at Buffalo, January 14, 15 and 16, with sessions in the rooms of the Builders Exchange and headquarters at Hotel Lafayette.

The twenty-fifth annual convention of the Pennsylvania State Association Master House Painters and Decorators will be held in Philadelphia January 14 to 16 inclusive with headquarters at Hotel Walton.

The twenty-second annual convention of the Massachusetts State Society Master House Painters and Decorators will be held in Boston, January 7 to 9 inclusive with headquarters at the American House.

New Home of Sage Foundation

The new home of the Sage Foundation, now in course of erection at Lexington avenue and Twenty-second street, New York City, will be nine stories in height with a sub-structure sufficiently strong to support three additional stories in case time should determine them to be necessary. There is a frontage of 95 ft. on East Twenty-second street and a depth of 66 ft. on Lexington avenue. The building will be constructed of Kingwood sandstone—a light brown stone with a pinkish tinge that has been used as yet for but a single building in New York City, this being the Synod Hall of the Cathedral of St. John the Divine, now in process of erection. The stone blocks will be left with the natural rough face with deep rustication.

The design of the building is what may be described as restrained Florentine style. There is little ornamentation save the shield above the main entrance and shields around the second story.

The main floor of the building will be devoted to a large exhibit hall and a lecture room, the platform in the latter being movable so that the two halls may be thrown into one at any time for purposes of a lecture, an exhibit or a reception. Offices for the various departments of the Sage Foundation, committee rooms, work rooms, etc., will occupy the second to seventh

floors inclusive, while the eighth and ninth floors will be devoted to the library. The ninth or mezzanine floor will have a lunch room and a rest room for women. The roof will be arranged for various uses.

One of the features of the structure, which is to be fireproof, will be a fire tower separated from it by brick walls.

Official Reference Book for Builders

The Contractors' and Dealers' Exchange of New Orleans, La., has made arrangements to issue an official reference book containing information useful to the building industry of the South, and especially to New Orleans. The book will contain all acts of the Legislature pertaining to the construction, contracting and building trades; the city building code; the state lien law; rules governing the New Orleans fire prevention bureau; progress recently made in the building industry in the residential and business sections of New Orleans; names and business classifications of the members of the Contractors' and Dealers' Exchange, as well as a list of names of local architects. The scheme will be somewhat similar to that which prevails among some of the larger exchanges of its kind in the country.

A New York Architect Wins

In a competition for the 16-story office and banking building to be erected for the Fletcher Savings and Trust Company, Indianapolis, Ind., the tentative sketches submitted by Electus D. Litchfield, 244 Fifth avenue, New York City, have been selected. The program for the competition was prepared by Professor Warren B. Laird of the University of Pennsylvania, and called for a building estimated to cost \$1,000,000.

The judges were Professor Laird, Walter Cooke and H. V. B. McGonigle. Architects from New York City, Chicago and Indianapolis competed.

Cost of Concrete Work

A very interesting paper on the economics of practical concrete work and containing figures of cost of material and especially of the cost of one yard of concrete was read before a recent meeting of the Indiana Engineering Society by DeWitt V. Moore, of Indianapolis, Ind., and from his remarks we take the following:

No proposals should be made upon a concrete job until the proper analysis has been made of all the elements entering into the concrete construction. It is not sufficient to say or to guess that the cost of a cubic yard is so much, but instead an analysis should be made of the cost of a cubic yard of concrete under the conditions specified. There are a great many elements entering into the cost determined by such an estimate, which may be briefly stated in the following:

Depending upon whether the concrete is to be made of a natural mixture of gravel or of stone and sand in various proportions will be based the cost of the aggregate. The amount of cement depends upon the proportions of the concrete, as also do the amounts of gravel, stone and sand. The cost of water for proper manipulation should not be overlooked. In cities the cost of water is determined by rates of 9 or 10 cents per cubic yard; outside of cities the cost depends upon the labor necessary to secure the water.

Concrete work remote from populous centers cannot be done at the same price as when close to such centers, unless the work is so remote that a permanent camp can be constructed and the laborers held by the very remote-

ness of the work. Work that is at some distance from the point of supply must bear a charge for transportation, handling and hauling of raw materials. This is a labor charge which is chargeable to material, inasmuch as the materials should be considered as f.o.b. the job; but nevertheless the cost is increased per cubic yard in the proposal.

Forms and Labor for Walls of Varying Thickness

A wall of concrete 27 ft. thick may be retained by the same forms and the same amount of form labor as are necessary for a wall 1 ft. thick. In the latter case the cost per cubic yard of concrete is 27 times as great. It is, therefore, not safe to estimate the cost of forms on a basis of guess price per cubic yard of concrete. Each individual job should be estimated for the amount of timber work as carefully as for any other item. It does not matter whether the cost is estimated on the basis of floor foot or concrete surface, or upon a basis of feet board measure of lumber—the result is the same, inasmuch as this important branch of concrete construction receives individual consideration.

There seems to be a misunderstanding as to the separation of forms and centers. Forms, properly speaking, consist of the timber work to form those members of concrete construction, such as columns, girders, etc., which must possess a certain regularity of form and evenness of outline. Centers, properly speaking, consist of timber supports for floor slabs, bridge centers, etc. Where the great amount of labor on timber work is expended solely for the purpose of supporting the mass at a uniform or definite height, the unit cost is much less than for forming for individual members.

Fabricated reinforcement will cost much more delivered to the job than loose bars; but, on the other hand, will cost much less to place in position. It is needless to say that a job where reinforcement is made up of small bars less than $\frac{3}{4}$ in. will cost much more per ton for labor than for large sections. Good judgment must prevail in this particular. It is very seldom that an estimate will be made based on the labor and the tonnage of each size bar. Rather it is the practice to strike an average labor price in harmony with the class of work to be encountered with reference to the different sizes of reinforcement. It is well to remember, however, that it takes practically as long for the steel man to place and wire a $\frac{3}{8}$ -in. bar as a $\frac{3}{4}$ -in. bar, while the tonnage is only one-fourth as great; and this point should be kept in mind in making an estimate.

There are a great many items of the cost of concrete work which are included in the cost of materials, labor, forms and centers, reinforcement, etc. These costs consist of installing and removing machinery, coal, oil, repairs and fittings to machinery, general charge items, such as rope and bolts, and the loss on petty tools, such as shovels. Such costs may be determined on the basis of so much per cubic yard, or preferably they may be determined on the percentage of labor on different classes of work. No matter what the method of determination, the costs are real expenses, and are as justly chargeable as those for gravel or cement entering into the work.

Estimate of Cost of One Yard of Concrete

In the line with the foregoing remarks and the importance of the detail study of concrete, we submit the estimate for a cubic yard of concrete which according to specifications should be of a 1:2:4 mixture, to be used for purpose of building construction, and making these estimates we desire to lay emphasis on the fact that no two jobs cost the same when itemized in this way:

0.9 cu. yd. gravel at \$1.20.....	\$1.08
0.45 cu. yd. sand at \$1.....	.45

1½ bbl. of cement at \$1.20.....	\$1.80
Water	.10
200 ft. B. M. of lumber at \$20, used four times at 20 per cent. less each time used, less 40 per cent. salvage.....	1.08
Reinforcement, 150 lb. per cu. yd. at 2½¢.....	3.75

Total cost of material.....	\$8.26
Labor concrete.....	\$2.00
Labor forms, 80 ft. B. M. at \$30.....	2.40
Labor centerings, 120 ft. at \$20.....	2.40
Labor reinforcement, 150 lb. at 1½¢.....	.75

Total labor.....	\$7.75
General charge items, proportion of labor 15 per cent.	1.13
Total actual cost 1 cu. yd. concrete.....	16.94

Each individual job that is encountered should be estimated in the same manner. It might not be necessary to throw the cost of forms and centers, reinforcement, etc., into the cost per cubic yard of concrete; but however the estimate is made it should consider all these items and in the end the result will be the same. If in addition there is to be applied a surface coat or finish its cost must be added.

Form and Centering Work

If there is any one item which adds to the cost it is the form and centering work. For instance, in the detail estimate just given cost of lumber and form and centering labor is \$5.88. If the work had been twice as heavy the costs of this labor would only have been half as much per cubic yard. This should bring home to every estimator the importance of dealing with temporary structural work as a separate unit. Personally the writer would rather guess the amount of reinforcement per cubic yard than to guess at the cost of forms and centers. The cost of labor is dependent upon the amount of concrete placed on the square foot of area of work covered, inasmuch as the cost of placing depends upon the distance traveled and the amount handled. The greater the distance the less the quantity and the more cost per unit, and the less the haul the greater the mass and the less the cost per unit. Such labor cost may reach anywhere to \$5 a yard, and it is suggested that a careful study be given each job to determine the amount of foot-pounds of work necessary to complete it.

It is suggested and recommended that each separate and distinct job should be given a detail cost recording in line with the foregoing in order that future work may be properly estimated. It is a very simple matter to arrange a cost record book with a system of time reports so that such records may be obtained and recorded without increase in labor or cost.

According to a bulletin just issued by the Forest Service of the United States Department of Agriculture, forest fires in the United States have caused the destruction of trees worth at the lowest calculation \$25,000,000 and the loss of stock, crops, buildings and other improvements to the amount of many millions more. In the order of their importance the chief known causes of the fires on the national forests have been railroads, 26.7 per cent.; lightning, 17.5 per cent.; campers, 16.9 per cent.; brush burning, 4.8 per cent.; incendiary, 4.5 per cent., and sawmills, 1.1 per cent.

In November permits were issued in Quincy, Mass., for buildings costing \$188,525, as against \$71,029 for November, 1911.

A SIX-FAMILY HOUSE OF CONCRETE CONSTRUCTION

Some Interesting Particulars Concerning the Method by Which the Double Walls Were Built—The Floor Plan Arrangement

A SHORT time ago there appeared in these columns an inquiry from a correspondent asking for plans of apartment houses suitable for occupancy by six families, the arrangement to show two families to a floor. Later there appeared a design for a building of this character from an architect in the extreme Northwest, and supplementing what has already been published we take pleasure in bringing to the attention of our readers, and particularly to the correspondent making the inquiry, the plans of a six-family house constructed of hollow concrete walls.

A picture of the building during process of construc-

tion at the front with the kitchen at the rear by passing through each of the other rooms, something after the manner in which one passes from the front to the rear in what are designated in New York City as "rail-road flats."

Each sleeping room is provided with a clothes closet built into the partition. The kitchen is fitted with two-part wash tubs, beyond which is the sink, so placed that the covers of the tubs may be used as a drain board. Against the opposite wall of the kitchen is a cupboard with double doors. The bath room is fitted with lavatory, closet and tub, and is lighted by an outside



A Six-Family House of Concrete Construction—General View of the Double-Wall Concrete Apartment House After It Had Been Enclosed and the Roof Put On

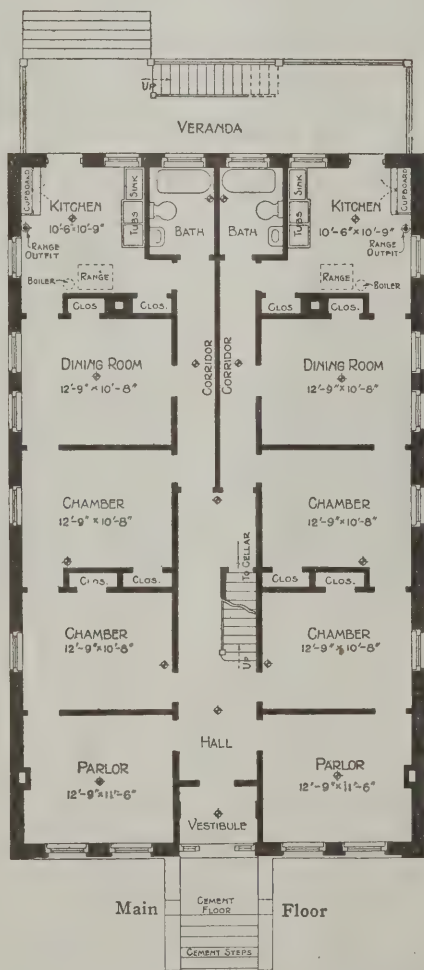
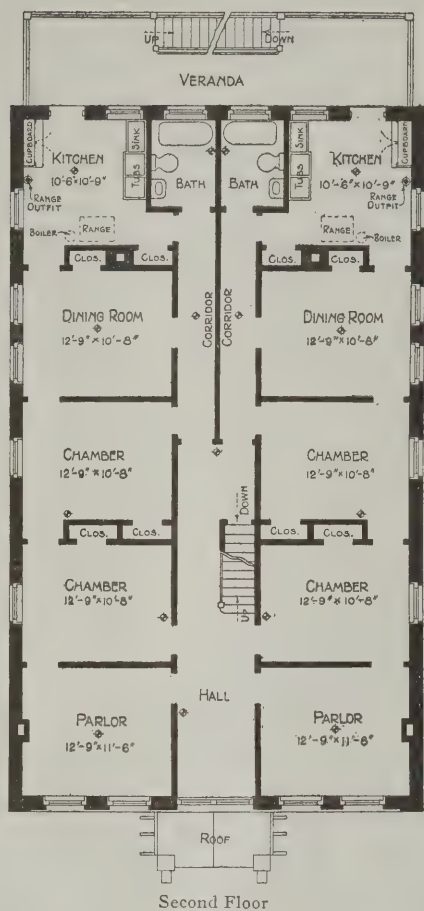
tion and after the walls had been completed is given upon this page, while upon those which follow will be found the floor plans and pictures showing some of the details of construction.

An examination of the floor plans, of which the first and second are here given—the third being arranged exactly like the second—shows each family to have five rooms and bath. From the main hall open the parlor and one sleeping room, while from each private hall access is given to the dining room, the kitchen, the bath room and a bedroom. The arrangement is such that there is also direct communication from the parlor

window which gives out upon a rear veranda with which each floor is provided.

The walls are hollow, the inner one being 6 in. thick and the outer one 4 in. These double walls are tied together every 2 ft. with $\frac{1}{4}$ -in. galvanized steel ties turned up at the ends, and each of the double walls is reinforced horizontally with $\frac{1}{4}$ -in. galvanized steel rods placed in every 9-in. course of concrete around the building.

A good idea of the appearance of the double walls may be gained from an inspection of the interior view presented herewith.



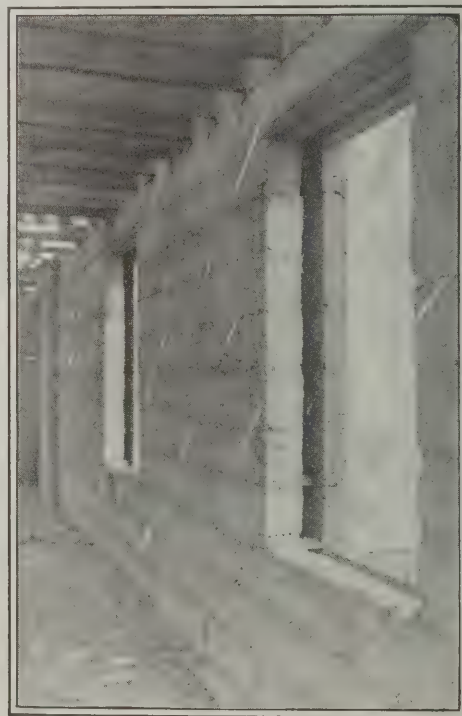
Floor Plans—Scale 1/16-in. to the foot

In the construction work two 5-ft. and two 2-ft. Van Guilder hollow wall machines, made by the Van Guilder Hollow Wall Company, 712 Chamber of Commerce Buiding, Rochester, N. Y., were used, together with pilaster and chimney attachments. The materials used were screened crushed rock $\frac{1}{4}$ to $\frac{3}{4}$ -in. size; sharp



The House in Process of Construction Showing Large and Small Machines with Chimney Flue in the Center and Carried Up With the Wall

sand and Portland cement, mixed in the proportions of 1:2:4. For some parts of the work a 1:6 mixture was used quite wet, so that the water showed when the machine was removed. The contractors did not find it necessary to wait for it to set before moving the machines along for another section, and the work was therefore continued right around the building. There



Interior View Showing 6-In. Inner Wall and 4-In. Outer Wall
A Six-Family House of Concrete Construction

were three courses laid per day, although in good drying weather four courses have been done.

The front corners and the chimney were built with the company's pilaster attachment, and in one of the half-tone views presented herewith large and small machines are shown in place with the chimney flue in the center and carried up with the wall.

The window sills and lintels were made in wooden

forms placed on the walls, filled with concrete and tamped. Another way, however, which could have been followed in making the straight ones would have been to make them in the machine on a floor with a reinforcing rod running along the center of them. In this way they can be made as fast as the machine can be filled and tamped, as it is not necessary for them to remain in the machine to set.

After the second story was reached the contractors decided to set the window frames and work right up to them by tacking a temporary strip on the frame which came flush with the wall. This system was found to work with entire satisfaction and to save a lot of time. The walls of the building here shown are said to have been put up in 30 days.

In preparing the concrete a Eureka mixer made by the Eureka Machine Company, Lansing, Mich., was used. The contract was executed by the New England Concrete Construction Company, Stamford, Conn., and the plans were prepared by Karl Hussels, of that place.

What Constitutes a Good Varnish

A good varnish has good body, sufficient to give good luster, yet not too heavy to work badly and dry unevenly. It works smoothly under the brush and spreads in a thin, even coat, free from streakiness, still has sufficient consistency. It is elastic when dry and will not crack. It is durable and for outside work particularly indifferent to the effects of moisture and atmospheric conditions. It adheres tenaciously to the material to which it is applied. It is of good color that will not darken on exposure. A good varnish is good only for its particular purpose, as a varnish "long in oil" is intended for exterior work, floors, etc., while a varnish "short in oil" is intended for inside trim work. The safest method is to use the varnish which a reliable manufacturer recommends for a given purpose, for that purpose.

How may varnish be tested? Varnish may be tested for paleness by placing a small quantity of it in a thin glass vial, and comparing it with any standard sample, by holding both samples to the light.

Varnish may be tested for wear by applying two coats to two pieces of well dried, carefully sandpapered, newly planed wood, says a recent issue of Pratt & Lambert's *Varnish Talks*. One piece of wood should be coated with the standard sample—the other piece with the varnish to be tested. Place both pieces of wood in an exposed exterior situation and note from time to time the appearance of the work. The piece which loses its brilliance and cracks in the shortest time has been coated with the inferior varnish. Of course by this test you must compare two varnishes intended for the same purpose, such as two interior varnishes, etc., and not two entirely different varnishes as an exterior varnish and an interior varnish.

Another simple test is to revarnish any suitable surface with the suspected sample, and when the varnish is thoroughly dry, rub it quickly with the finger. If the new varnish crumbles up quickly, it evidently contains an inferior gum or most probably a large proportion of rosin. A good copal varnish cannot be removed in this way. A method of testing varnish for elasticity is to apply two coats of it to a sheet of linen and after it has properly dried, try its flexibility or tendency to chip off by crumbling between the hands.

A feature of the Guaranty Trust Company's building, now in course of construction at Broadway and Liberty street, New York City, is its pyramidal roof, which has attracted much attention on the part of builders.

Cost of Concrete Walls

With the increasing popularity of concrete construction the question often comes up as to the cost of different forms of work of this nature. Not long since an interesting discussion developed concerning the economy of blocks as one kind of unit wall construction, and the *Cement Age* published the views thereon of two well-known experts in concrete construction. One of these, Alan P. Wilson, of Milwaukee, furnished the following:

"In talking with a contractor who has been using metal forms for the past three seasons, I asked him for some inside information, not only as to the cost of handling metal forms, but of placing concrete in walls raised about 20 ft. above grade. This contractor places his concrete exclusively with wheelbarrows, so that the figures he gave are doubly interesting.

"He said that after three years' experience with metal forms he can mix, form and place concrete in 12-in. walls at $4\frac{1}{2}$ cents per square foot of wall, or $\$1.21\frac{1}{2}$ per cubic yard.

"On basis of material prices, above mentioned, 1:3:5 concrete containing

1 bbl. cement at \$1.50.....	\$1.50
12/27 yd. sand at \$1.50.....	.62
20/27 yd. stone at \$1.50.....	1.10
1 lb. steel at \$0.02.....	.02

Costing in all..... \$3.24

would make, allowing $1\frac{1}{4}$ yd. of loose material for each yard of concrete, 28.2 cu. ft. of concrete, at a cost, for materials, of 11.5 cents per cubic foot.

"This would make the cost per square foot of a monolithic wall, 12 in. thick, as follows:

Material	11.5 cts.
Mixing and placing, including necessary staging.....	3.0 cts.
Forming with metal forms.....	1.5 cts.

Total cost of wall per sq. ft..... 16 cts.

"Comparison between a 12-in. monolithic concrete wall and a cement block wall of the same thickness is manifestly absurd, as a monolithic wall only 6 in. thick would be very much stronger and more impervious to wind and water than a 12-in. block wall. The cost per square foot of 6-in. monolithic wall would be as follows:

Material, $\frac{1}{4}$ cu. ft. at 11.5 cts.....	5.75 cts.
Mixing and placing.....	1.50 cts.
Metal forms.....	1.50 cts.
	8.75 cts.

"Some allowance must be made for added cost of staging, but this contractor's experience has been that one-fourth of one cent will amply cover the difference between 12-in. and 6-in. walls, so that 9 cents per square foot would amply cover the actual cost of a monolithic concrete wall, on basis of material prices as given.

"The figures above given are based on experience on a wide range of work covering a long period. They include every item of expense incidental to the construction of monolithic concrete walls, including mixing, wheeling and spading the concrete, cost of staging, setting up, removing and cleaning the metal forms, transporting the equipment from one job to another, and an allowance for interest upon and depreciation of the value of the equipment.

"If a finish coat is applied to the surface of the monolithic wall, it can be given a smooth and uniformly colored finish at a total cost for labor and material not exceeding $2\frac{1}{2}$ cents per square foot of exposed concrete. The surface left by metal forms of proper design is so smooth, however, that on a wide range of work no surface treatment is required."

The contribution to the discussion furnished by Milton Dana Morrill, the well-known Washington architect, is as follows:

"We are constructing concrete walls with a mixture

proportioned one of cement, two of sand and four of gravel, laid in 6-in. walls at \$5.40 per cubic yard. Cost of materials as follows:

1 cu. yd. gravel.....	\$1.50
½ cu. yd. sand.....	.60
1¼ bbls. cement.....	1.50
Erection and removal of steel forms 1 ct. per surface ft. of wall	1.10
Handling concrete by spouting method, per cu. yd.....	.70
Cost per cu. yd.....	\$5.40

"One cu. yd. of concrete makes 54 sq. ft. of 6-in. wall. The cost of our walls has been an average of 10 cents per square foot. The logical construction of reinforced concrete is by the poured process, provided form cost can be brought within reason, which has not been possible to the best of our knowledge with the use of wood. Our walls poured in steel forms require no such expense in finishing as is necessary in a rougher wall or in a wall of concrete blocks. We float up the surfaces with water, or sand and cement upon the removal of the forms while the concrete is green.

"The cost of this finish is 1 cent per square foot, which includes the floating and brush coating. The monolithic wall furred on the inside, if climatic conditions demand it, offers not only the best wall which can be built but also the cheapest wall which is possible today. While the monolithic wall contains more concrete than the wall of hollow blocks, a greater amount of cement is necessary per square foot of block walls, as the mixture in the case of blocks must be at least one of cement to three of sand, whereas one to six makes an ample mixture for a reinforced wall for a two-story house, which we are constructing 6 in. in thickness for suburban dwellings.

"The form cost as above given, 1 cent per square foot of wall area, including both sides of walls, shows where the saving has been made. Whereas in lumber the form cost varies from 5 to 15 cents, we are con-

structing at ½ cent per square foot. As a fireproof material the monolithic structures have stood the test much better than hollow blocks of any material. This has been illustrated in a number of cases where residences built with poured walls have been gutted by fire, but the walls have stood intact and ready for use again. In the poured process unskilled labor can be largely employed, whereas with block construction skilled masons are employed for the work.

"The economy of the poured concrete wall has been shown in a score of houses built in the vicinity of Washington, and the poured construction of reinforced concrete, in the writer's opinion, is not only the most substantial, but also the least expensive construction now available."

Julius Fleischmann, head of Fleischmann Brothers Company, contractors and builders, 507 Fifth avenue, who died November 12, aged 62, was well known to the building fraternity of New York City. The company with which he was so long identified is the successor of the old firm of J. Fleischmann & Sons, which executed many large contracts in the city, including the Montefiore Home at Amsterdam avenue and 138th street; the Home for the Aged and Infirm in West 106th street between Columbus and Amsterdam avenues; the Home for Crippled Children; the Columbia Bank; the Temple Israel; the Fulton, Shubert, Greeley Square and Eltinge theatres.

During the past two years the value of buildings erected in Johannesburg, South Africa, amounted to about \$15,000,000.

STANDARD SIZES OF CONDUIT FOR WIRING BUILDINGS

Results of Investigation by National Electrical Contractors' Association Through Its Executive Committee—A Series of Six Charts Showing Proper Sizes of Conduits for Various Wire Systems

IT is very evident that the tendency of the times on the part of architects, engineers, inspection departments and municipal authorities is toward the requiring of metallic conduits for the installation of wires in buildings.

Recognizing this tendency the National Electrical Contractors' Association, through its executive committee, has been working on the preparation of reliable data in regard to the proper size of conduit to be used in installing wires and cables.

The disposition in the past has been to use conduits of too small interior diameter, and in the preparation of those charts care has been taken to recommend conduits of sufficient size to cover all their conditions, and at the same time having in mind that the economy in installations should be considered and extravagant sizes in conduits not recommended. We, therefore, feel that the sizes recommended are sufficiently large and at the same time conservatively calculated.

Very nearly a year has been spent in the study and investigation of this subject, and this has resulted in the preparation of charts showing in full size the proper sized conduits to be used for installation of various combinations of wires and cables, and these charts were officially adopted at the twelfth annual meeting of the National Electrical Contractors' Association.

The charts show the conduit and conductors in full size, and the prints are made from plates so that there can be no variation in size, and the sheets are mounted on heavy board with an eyelet at the top for hanging.

In addition to showing the size conduit needed for each combination of wires, the charts give the actual external diameter of the conduit and the carrying capacity of the wires shown.

The complete set comprises six charts and shows the proper size of conduit for one, two, three, four and convertible three-wire systems; combinations of duplex wires in sizes number ten, twelve and fourteen B. & S. gauge; single-wire combinations of number fourteen B. & S. wire up to ninety wires; combinations of number sixteen, number eighteen B. & S. fixture wires up to one hundred and fifty wires, and combinations of telephone wires up to fifty pairs.

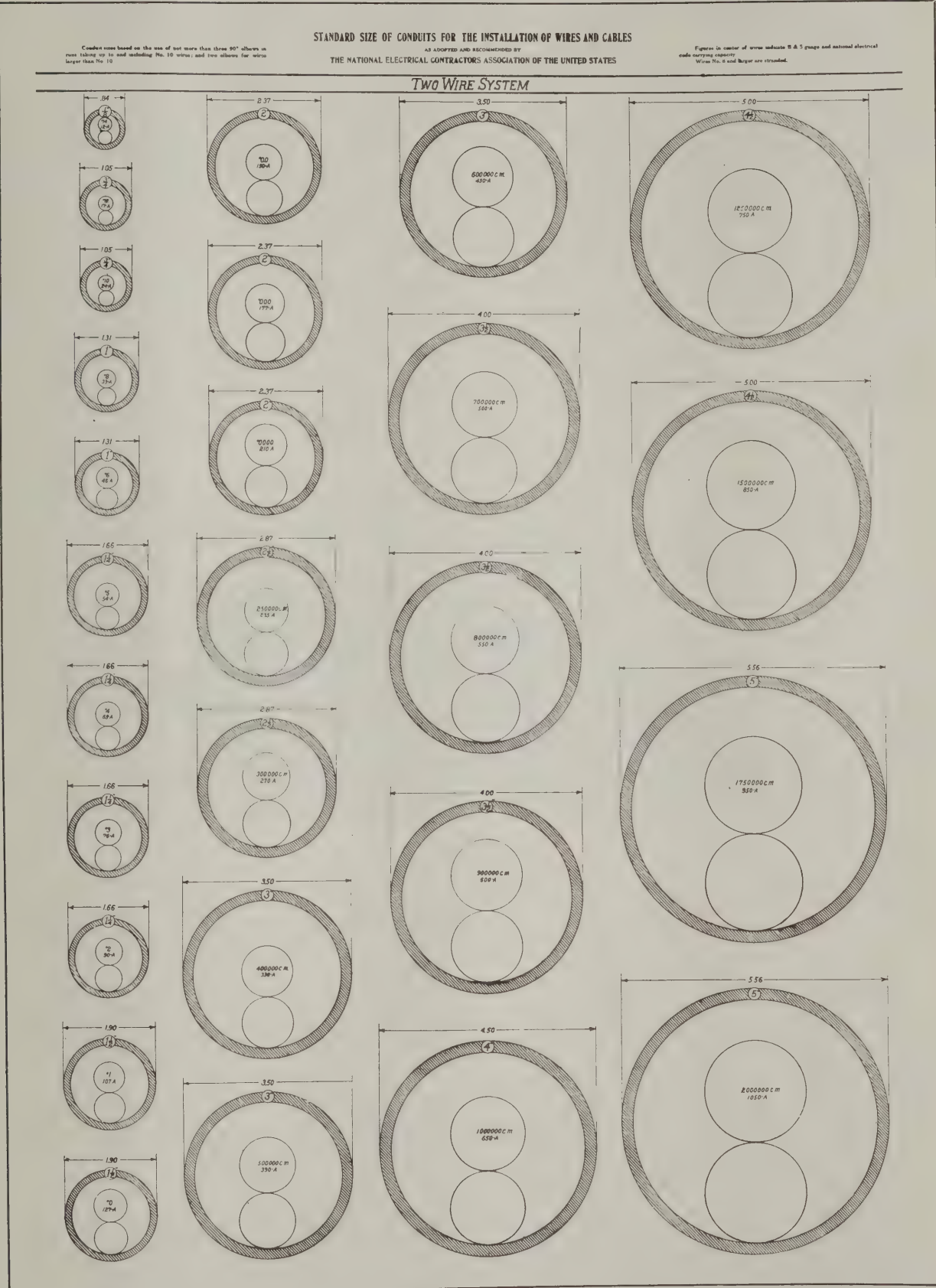
This covers practically all of the data required for the installation of wires and conduits, and presents it in a form most convenient for use.

We present herewith a reduced *facsimile* of the chart covering the two-wire system. At the left of the title at top of cut is this inscription:

"Conduit sizes based on the use of not more than three 90° elbows in runs taking up to and including No. 10 wires, and two elbows for wires larger than No. 10."

On the right-hand margin the inscription is as follows:
"Figures in the center of wires indicates B. & S. gauge and National Electrical Code carrying capacity. Wires for No. 8 and larger are stranded."

Contractors' Association that those having to do with the installation of conduits will accept the charts as prepared and write into their specifications that "the sizes of all conduits shall be the N. E. C. A. standard."
The National Electrical Contractors' Association has



Standard Sizes of Conduits for Wiring Buildings

The advantage of a standard system is self-evident from the standpoint of the architect, engineer and contractor, and it is the hope of the National Electrical

Contractors' Association that those having to do with the installation of conduits will accept the charts as prepared and write into their specifications that "the sizes of all conduits shall be the N. E. C. A. standard."
The National Electrical Contractors' Association has borne the work and expense of the preparation of these charts and in the interest of standardization is prepared to furnish these charts at the actual cost of production.

LIGHTING OUR RURAL HOMES WITH ACETYLENE

Contractors and Builders Are Beginning to Realize That the Furnishing of an Acetylene Lighting Plant for Buildings They Erect Is a Legitimate Part of Their Business

By JOHN T. EARL*

THE question of adequately and attractively lighting the home, church, store, hotel or other building is one which has been much neglected by architects, carpenters and builders, although, naturally, it should be part of their duties to at least suggest this improvement to those for whom they prepare plans and construct buildings. There is certainly no other one improvement they can possibly recommend which will do more to enhance the comforts of their clients or add to the attractiveness and permanent value of the property, or for which they would receive a greater measure of praise from their customers for whom they might install a dependable lighting service. In the cities and larger towns the problem is comparatively easy, for it usually consists of choosing between the service offered by the coal gas company and that tendered by the company that furnishes electricity.

In the smaller towns, the farming communities and the nearer-to-nature resorts, the problem is not so simple, since it involves not only a choice between illuminants, but also between devices that will produce light. It seems a fair assumption that for properly lighting homes, no matter how isolated, kerosene lamps are inefficient and will soon become a part of the historic past.

They are heating, throw out a disagreeable odor, deplete the air of its vitalizing element, require much time for their care and are a source of greatest danger to life and property.

Acetylene is the youngest of the illuminants, and has made rapid strides in public favor. The light is of a soft white, yet powerfully penetrating nature, the latter property causing its adoption by American and foreign governments for lighthouse service. It rivals electricity in non-heating quality, does not asphyxiate, and is ready for instant use at all hours and in all portions of a building. The gas is also useful as a fuel for cooking. It may be piped from a single plant to any number of buildings. It is popular for church use, and is highly regarded for lighting primary schools and colleges.

Crude apparatus of any kind is faulty, and the acetylene generators made by tinsmiths and other unscientific inventors, through their unsafe and faulty operation, have done much to injure the industry in the minds of those not thoroughly informed. Incidentally the standard machines have had to force their way to deserved recognition, which they have secured solely on the ground of merit. The National Board of Fire Underwriters have passed the correctly made

type and they may be installed anywhere without increased insurance rates.

Architect C. E. Schermerhorn, of Philadelphia, says in a booklet entitled "House Hints for Those Who Build": "The best types of acetylene generators now on the market are simple in construction, positive and reliable in operation and modest in cost."

Architect Wm. H. Hoover, Jr., of Elizabeth, N. J., designed the Tarrytown, N. Y., postoffice building, which is lighted by an acetylene plant, city coal gas and electricity, and he avers that the postmaster, his assistant and the whole staff of clerks, carriers and others use the acetylene lights almost exclusively, and that it is a gratifying circumstance since it results in reducing the monthly bills for lighting, "giving better light for less money."

Wide-awake and progressive contractors and build-

ers are beginning to realize that the furnishing of an acetylene lighting plant for the buildings they erect is a legitimate part of their business, from which a satisfactory additional profit can be secured, and are, therefore, arranging to sell and install such apparatus. In fact, many of them do not confine themselves to the equipment of new buildings only, but during the winter

months or other dull seasons are selling and installing them in homes and other buildings already erected, thus giving them a remunerative business and oftentimes creating a sufficient demand for the outfits to justify them in giving the business their entire time and attention. This is more than possible where the system installed is one which has proven its quality by years of service.

The Davis Acetylene Company, 180 Crawford St., Elkhart, Ind., invites our readers to investigate their proposition, and offers acetylene lighting apparatus proven by more than twelve years of use in every section of the country.



Typical Farm Home and Barn in Michigan Lighted by Acetylene.

Another addition to the commercial structures which are to be found thickly scattered along Fifth Avenue, New York City, in what was a few years ago an aristocratic residential section, is the 18-story loft and office building which will occupy the southwest corner of the avenue and Thirty-first Street. The building contains 4100 sq. ft., having 30 ft. of frontage in Fifth Avenue and 100 ft. in Thirty-first Street. The architects are Davis, McGrath & Kiessling, No. 1 Madison Avenue, New York City.

*Vice-president Davis Acetylene Company, Elkhart, Ind.

New Publications

The Principles of Structural Mechanics.—By Percy G. Waldram; 368 pages. Size $5\frac{1}{4} \times 7\frac{3}{4}$. Over 200 illustrations. Bound in cloth. Published by B. T. Batsford. Supplied by *Building Age* Book Department, 239 West 39th Street, New York City. Price \$3.00 postpaid.

The author of this work is the lecturer on structural mechanics in the Architectural Section of the Central School of Arts and Crafts in London, England, and the book has been especially prepared for the use of architects. The average treatise on structural mechanics very often proves difficult reading for the man who is not thoroughly conversant with mathematics, as many of the treatises require the use of calculus.

The author of the work above referred to has therefore endeavored to set forth in simple language and in a way to be clearly understood an explanation of the mechanical facts with which the architect and the engineer daily have to deal. The student who will carefully peruse the matter within the covers of this book will have an exact knowledge of the natural laws with which the designer has to cope and will therefore be able to apply freely and intelligently the formulas generally used in the theory of structures, this intelligent application of the said formulas being too infrequently met with among draftsmen and even among designers.

Such terms as "moments of inertia," "radius of gyration" and others which are sometimes dealt with as incapable of other than mathematical expression, are defined with clearness and "arch and dome stresses," "deflection" and "column theory" are also simply explained. An explanation of the use of the slide rule is also presented.

Two outstanding features of the book are a very interesting chapter on domes and another on wind pressures, in which is a summary by Dr. Stanton of the results obtained from experiments carried out at the National Physical Laboratory at Teddington.

Structural Details of Hip and Valley Rafters.—By Carlton Thomas Bishop, Assistant Professor of Civil Engineering, Sheffield Scientific School of Yale University; 72 pages. Size 11×8 in. Profusely illustrated by general drawings and typical problems. Bound in cloth. Published by John Wiley & Sons. Price, \$1.75.

At the present day when iron and steel construction is so largely employed in the erection of commercial buildings of all kinds and especially in the supporting members of roofs of wide span, all the reliable contributions to the literature of the subject are of unusual interest and value. In the preparation of the work under review the author has aimed to meet the requirements of structural draftsmen when solving problems in hip and valley construction. Complete directions are given for making the shop drawings for the steel work of intersecting roofs and similar structures. The notes for the various cases are arranged for convenient reference and are illustrated by general drawings and typical problems. The necessary numerical values may be obtained either algebraically or graphically, and both methods are fully explained. Much of the calculation is simplified by means of tables which give values for use in the most common cases.

The author states that in his experience as structural draftsman he made use of numerous systems of calculation, but found that no system fully met the requirements of his needs without alteration or addition; that while the majority were effective in showing the derivations of the more difficult angles, few explained

the application of the angles or referred to the additional values required. The author felt that there existed a demand for a complete treatise of this nature and accordingly the book under review was developed.

The subject matter is treated in six chapters followed by a series of tables giving values and logarithms for common cases.

Mission Furniture and How to Make It. Part III.—Size $4\frac{3}{4} \times 7$ in. 128 pages. Profusely illustrated. Bound in cloth. Published by Popular Mechanics Company. Price 50 cents.

This is the third part of an interesting series of handbooks on Mission Furniture design. The point is made by the author that the new designs here shown have never before been published and are entirely different from those appearing in Parts I and II, already issued. The illustrations and descriptive text are such that almost any carpenter, cabinet-maker or other mechanic who is clever in the use of his tools can readily execute the work. In connection with the description of each piece of furniture illustrated is a stock list which calls for material mill-planed, sanded and cut to length.

A feature of the new book is a dining-room set covering extension table, buffet, plate rack, chairs, sideboard, etc. Other designs embrace book rack, writing desk, dresser, hall tree, library table, magazine rack and stand porch swing, sewing table, umbrella stand, wardrobe, window seat, den table, etc.

Buildings at Panama-Pacific Exposition

The third meeting of the Architectural Commission of the Panama-Pacific Exposition was held in San Francisco Dec. 2. Bids will soon be called for machinery hall, of which Ward & Blohme are the architects. This building will be over 900 ft. long by 360 ft. wide, consisting of three great naves running the entire length of the building, spanned by wooden arched trusses of 75 ft. span and 100 ft. high. The architectural style is similar to that of Roman baths. The horticultural building, Bakewell & Brown, architects, will be almost entirely of glass, and will cover 5 acres, with a dome 150 ft. high. The tower of the administration building, Carrere & Hastings, New York, architects, will cover about an acre, rising 375 ft.

Other buildings planned are: the festival hall, Robert Farquhar, architect; palace of fine arts, B. R. Maybeck, architect; court of four seasons, Henry Bacon, architect; court of abundance, L. C. Mulgardt, architect, and south courts, Geo. W. Kelham, architect.

Lumber Trade Association

At the annual meeting of the New York Lumber Trade Association, held November 15, the following officers were elected for the ensuing year: President, Russell J. Perrine (re-elected); first vice-president, John F. Steeves; second vice-president, Frederick W. Starr, and treasurer, Charles F. Fischer.

At the present time the association has a membership of 201, of which 85 are wholesalers and 99 retailers.

A recent bulletin of the Engineering Experiment Station of the University of Illinois is devoted to a series of tests in the line of investigating the value of concrete as reinforcement for structural steel columns. The compilation is by Arthur N. Talbot, Professor of Municipal and Sanitary Engineering and in charge of Theoretical and Applied Mechanics, and Arthur R. Lord, Research Fellow in Theoretical and Applied Mechanics. The columns tested were of a form now frequently used in building construction.

WHAT BUILDERS ARE DOING

Bird's-Eye View of Building Situation in Leading Cities—Estimated Value of the Projected Improvements



THE feature of building operations in the city of Baltimore, Md., has been the construction of brick dwellings of the two-story type, although from this it must not be inferred that frame construction has altogether been neglected. The figures compiled in the office of the Building Inspector covering the month of November show that permits were issued that month for new construction to cost \$751,365 and for 180 additions involving an expenditure of \$152,800. There were more than 1000 alteration jobs costing about \$80,000, thus making the total for that month \$984,165. In November 178 two-story brick dwellings were planned costing \$300,025, and 11 three-story brick dwellings costing \$29,640. A city school was planned involving an outlay of \$152,350.

For the 11 months the total cost of building operations was \$7,428,445. Of this amount \$3,229,329 was involved in the construction of the 2024 two-story brick dwellings for which permits were issued. There were also 118 two-story frame dwellings costing \$515,850 and 56 three-story brick dwellings costing \$281,240.

Other improvements during the first 11 months ending December 1, 1912, included four office buildings costing \$555,000 and four city schools costing \$396,688. There were eight apartment houses costing \$165,000, together with eight churches costing \$126,000 and two hospitals costing \$114,000.

Buffalo, N. Y.

Building permits issued for November totaled 290, with an aggregate valuation of \$836,000. The percentage of gain over the corresponding month of 1911 was 33 per cent., permits for that month numbering 206 and the valuation being \$606,000.

An unusually large number of buildings are now under way both in the business and in the residential sections. The continued open weather conditions prevailing during the late Fall have been exceptionally favorable for the prosecution of exterior construction and work is being hurried to insure the exterior completion before the setting in of severe winter weather.

Plans filed for November call for a number of building improvements of importance. Among the commercial structures is a four-story grain elevator and warehouse for Wollenberg Bros. at Goodyear avenue and the West Shore Railroad; a 2,000,000 bushel grain elevator of reinforced concrete construction (25 bins each 25 ft. in diameter by 107 ft. in height), for the Washburn-Crosby Company, to be added to its extensive flouring mill plant on the City Ship Canal, for which Jas. Stewart & Co., Chicago, have the contract; warehouse, receiving and shipping depot for the Queen City Dairy Company, Seneca street, to cost \$60,000, and a warehouse for the Barcalo Mfg. Company. Others include a paint manufactory, four-story and basement, 50 x 165 ft., for the Laclede Mfg. Company; plant additions for the Republic Metal Ware Company, the Otis Elevator Company, the Sterling Engine Company and the King Sewing Machine Company; a store and apartment building, East Utica street, for J. C. Henkel, from plans of Architects Dunning & Dunning, to cost \$30,000, and a store and theater building at Main street and Fillmore avenue to be erected by the Buffalo Cement Company to cost \$35,000.

Plans are in preparation for a number of buildings of the first class to be erected next spring and summer, including a 20-story hotel in the central business district and new Municipal General Hospital buildings on the "West Farms" at Kensington avenue and Grider street, involving an expenditure of about \$1,500,000.

Canton, Ohio.

The first annual meeting of the Canton Builders' Exchange was held on December 4 and was a most interesting occasion. The reports presented showed an increase in membership for the year of 110 per cent. and the feeling is strong among the officials of the organization that the membership will be doubled during the ensuing year.

A new Board of Directors was chosen for 1913, consisting of O. H. Bachtel, Ferd Zettler, C. R. Kumpf, Owen Custer, Chas. M. Kilgore, E. J. Landor and R. G. Vincent.

The Board of Directors immediately organized by electing the following officers:

<i>President</i>	Charles M. Kilgore
<i>Vice-President</i>	O. H. Bachtel
<i>Secretary</i>	Charles R. Kumpf
<i>Treasurer</i>	Ferd Zettler

On the 27th of November the Exchange held a sociable and it is expected that these very interesting occasions will be continued throughout the winter season. On the date named various papers were presented, one by O. H. Bachtel dealing with "What Our Organization Means to the Building Interests; Its Benefits," another by J. A. Jeffers on "The Liability Law (Workmen's Compensation Act) and Its Relationship to the Builder and Kindred Interests," while another by Edmund Herrmann, a local architect, discussed "The Comparison of European and American Building Construction." The papers were well received and showed much thought on the part of those who prepared them. It is expected that at future meetings additional papers will be presented along educational lines, so that the winter season may be fruitful of much good to all concerned.

Building conditions are rather quiet at present and are likely to so continue until the early spring months.

Chicago, Ill.

Building statistics for November show that little change has occurred in the industry when compared with the same month one year ago. The number of permits issued was 851, as compared with 884 in November, 1911, but the frontage and estimated cost involved shows a slight gain. The November, 1912, report shows a total frontage of 27,298 feet, with an estimated cost of \$7,625,000, the same month last year producing 26,818 feet of frontage, estimated cost being \$7,174,000.

Figures for the year to December 1 show that 10,771 permits have been issued, the total frontage being 313,817 feet and the estimated cost \$83,175,900. The same period for 1911 produced 10,351 permits, frontage 276,553 feet, estimated cost \$98,464,400.

Martin W. Philipsborn, representative of the Outer Garment House, has contracted a 30-year lease on property situated on the northwest corner of Van Buren and Peoria streets. A seven-story building will be erected thereon, which will be of fireproof construction and will cost in the neighborhood of \$150,000.

The first unit of the plant to be erected for Sears, Roebuck & Co. at Kansas City, Mo., will be a structure nine stories in height, with a ground area of 221 x 101, the cost of which will aggregate \$425,000. This building is being erected by J. Ogden Armour and George W. Swift. The entire plant to be erected will cost in the neighborhood of \$3,000,000. The present building will be of reinforced concrete and will be faced with gray terra cotta. One of the features will be a large tower rising well above the main structure.

Plans are under way for the erection of a group of five apartment buildings, the cost of which will be upward of \$300,000. The location is Ridge avenue, between Main and Washington, Evanston. The block will have a frontage of 400 feet. The "apartments" will con-

sist of suites of four, five and six rooms each. The finish will be in English oak.

There are seven first class theatres now in course of construction, averaging a seating capacity of 1200 persons. In all there are 635 theatres in the city of Chicago, 44 of them considered as first class theatres, the rest having an average seating capacity of 500 people. The cost of the theatre buildings now being built is in excess of \$2,000,000. The seating capacity, considering theatres of all classes, is estimated at 408,300, and figuring the population of Chicago as 2,500,000 there is a theatre for about every 4,000 persons in the city.

Cincinnati, Ohio.

The month of November is about on an equal basis as regards building operations with the corresponding month of 1911. There were 1090 permits issued, with a total valuation of \$526,145, while in November, 1911, there were 798 permits taken out, with an estimated cost for improvements of \$554,990. The total given includes elevator and plumbing inspection permits that do not add to the total improvement estimates.

Excellent weather conditions helped out many contractors, but the scarcity of skilled workmen as well as labor troubles between the steamfitters and plumbers and later between the carpenters and sheet metal workers has delayed work on several large buildings.

In the city proper not a great deal of residence building is going on, but in the suburbs there is relatively speaking more activity. A number of apartment buildings are under schedule and work will commence on them early in the spring.

Cleveland, Ohio.

A very satisfactory amount of new building work is coming out for this time of the year. During November there were 625 permits issued for new buildings to cost \$1,230,812. Of these 143 were for frame buildings to cost \$371,254; 64 were for brick, stone and steel buildings to cost \$649,650, and 440 were for additions, the estimated cost of which is \$209,912.

During the eleven months of the year until December 1 there were 8306 permits issued as compared with 7860 for the corresponding period a year ago. The permits for the year until December 1 aggregate \$15,662,648, as compared with \$16,994,677 during the whole of 1911. These figures show that the total amount of building during the year will be practically the same as during the record breaking year of 1911.

Contracts were placed early in December for a 14-story building to be erected on the public square by the Cleveland Electric Illuminating Company and contracts will be placed late in the month for completing the new city hall building, work on which was suspended a year ago after foundations were completed in order to allow changes to be made in the plans. Considerable small building work was placed during the month and there are a large number of quite important building projects that are expected to come out early in the year.

Dayton, Ohio.

A total of 49 building permits, contemplating the expenditure of \$593,078, were issued in November, against 40 permits amounting to \$75,875 during the same month last year. The permits for this year include a \$400,000 office building addition and an \$80,000 factory building.

The number of permits issued in the first eleven months of 1912 show a considerable falling off as compared with the corresponding period of the year before. This is caused mainly by the fact that the sale of houses on the installment plan by real estate companies has been very slow and consequently these companies have not built their usual quota. While there are no values available for the whole of last year, it is believed that the better class of construction this year will more than offset the money value of improvements last year.

Galveston, Texas.

There is rather more than the average amount of building in progress in the city and during the month of November building was particularly active. An unusually large number of residences were started during the month and several of the larger operations under way in the downtown district were brought to completion while others were commenced.

During November 45 permits were issued by the city secretary, John D. Kelley, for buildings estimated to cost \$201,328, while in October 74 permits were issued valued at \$63,837.

The outlook for building in the future is bright and it is predicted that 1913 will witness even greater activity than has been experienced during the past twelve months.

Los Angeles, Cal.

Permits were issued in November for buildings having a total valuation of \$2,597,723, compared with \$2,677,780 for October, and \$1,797,233 for November, 1911. The number of permits also dropped off slightly from the preceding month, the November record showing 1476 buildings. Of these only two were for steel frame structures, with a combined value of \$305,000, while four were for small Class A concrete buildings. There were 32 Class C buildings, valued altogether at \$537,377. Of small frame buildings, mostly dwellings, there were 632, valued at nearly \$1,300,000, the decrease from the previous month in this class of work being greater than the drop in the total valuation.

Contracts have recently been let for several state buildings in and around Los Angeles, including the local armory, to Robert Trost, San Francisco, at \$186,850; the Santa Barbara normal school, to Beer & King, at \$87,450, and the Southern California Hospital. Other important buildings for which contracts have recently been let are: A 5-story concrete hotel on Hope street, near Seventh, to F. O. Engstrom Company, at \$130,000; the Ford motor car building at E. Seventh street and Santa Fe avenue, to Carl Leonhardt, at about \$200,000, and the concrete Pasadena National Bank Building, to W. C. Crowell, Pasadena, at \$65,000.

Among the principal buildings to come up for figures soon are the following: A 7-story concrete warehouse on Arapahoe street near Washington, Mayberry & Parker, architects; a 10-story hotel on Figueroa street near Sixth, to cost \$200,000, Anton Reif, architect; a 9-story steel frame building at Fifth street and Broadway, Parkinson & Bergstrom, architects; the 12-story Medical Association building, J. F. Blee, architect, and a \$100,000 laundry building at Pico and Wall streets, Mayberry & Parker, architects.

Louisville, Ky.

The members of the Builders' Exchange enjoyed one of their biggest kaffee klatsches on the evening of December 6 at the Realty Building, when Gus Albrecht, Jr., acted as host. The refreshments were coffee, kuchen and doughnuts. Impromptu speeches of an interesting and amusing character were made between bites by William Heeb, Charles Koerner, Colonel Bourlier and Arvid Noral. Before the conclusion of the sociable a game of lotto was played.

Milwaukee, Wis.

The very open winter which has thus far prevailed in this section has stimulated building operations to some extent and there were 301 permits issued in November representing buildings valued at \$1,646,540 as against 275 permits issued in November, 1911, for buildings valued at \$991,710.

The building operations in the city during the 11 months of 1912 ending December 1 represented an investment of \$14,708,224, which is an increase over the same period of 1911 of \$3,200,693. It is estimated that the total for the year will exceed \$15,000,000. The permits issued in the two periods were 3801 and 4172 respectively.

Newark, N. J.

While the weather has continued unusually favorable for out-door work, building operations in November showed a slight falling off as compared with the corresponding period a year ago. Superintendent of Building William P. O'Rourke reports 213 permits having been issued in November for building improvements estimated to cost \$706,806, while in November, 1911, there were 258 permits granted for building operations involving an outlay of \$898,964.

With the work on the boards of local architects and some plans in the office of the Building Department for consideration the total for the year is likely to make a fair showing.

Oakland, Cal.

Building conditions in the towns east of San Francisco Bay are highly satisfactory, the November record in this city being the best since July, and with the exception of July and May the best month of the year. The total valuation of buildings for which permits were issued was \$987,294, compared with \$619,073 for the previous month and \$810,046 for November of last year. The value is well divided between permanent and wood-

en types of construction, the continued fair weather being highly favorable to home building.

School contracts let during the month include the Park and Division street school, to O. B. Ackerman & Sons at \$66,999, and the Dewey school, to Williams Bros. & Henderson at \$103,300.

Plans have been approved and contracts will soon be let for a \$75,000 edifice for the First Hebrew Congregation at Twenty-eighth and Webster streets.

Pasadena, Cal.

All building records for November were shattered in 1912 when 158 permits for building improvements were issued, calling for an estimated expenditure of \$210,903.10. In November, 1911, there were 121 permits issued for buildings estimated to cost about \$25,000 less than in November last.

The largest single building for which a permit was issued during the month under review was that for the Pasadena National Bank, which will cost about \$85,000.

Philadelphia, Pa.

Statistics compiled by the Bureau of Building Inspection show a material gain for November over the same month in 1911. For the first time in several months two-story dwelling operations showed a gain over the same month last year, although as customary at this season the total for that class of work was smaller than in October.

During November the Bureau of Building Inspection issued permits for 1225 operations at an estimated cost of \$1,919,880, a gain of \$304,765 over November last year. For the eleven months of 1912 permits have been issued for 14,038 operations at a total estimated cost of \$34,614,745, as compared with 15,689 operations costing approximately \$38,293,145 during the same period last year. Few large operations were begun during November, either in dwelling houses or other classes of building work. Two-story dwelling operations numbered 309, costing about \$709,900, a decline from the expenditure authorized in October. The only other important item was that authorizing work on four tenement houses at an aggregate estimated cost of \$08,000. Garages contributed \$41,115 to the total. Had operative dwelling house operators not sharply curtailed constructive work during 1912 building operations generally would probably have exceeded all previous records, but a decline in two-story houses alone of \$5,916,020 during the past eleven months, as compared to the same period in 1911, has not been overcome even by the large increase in general building as well as the liberal volume of hotel and office buildings the past six months.

General conditions in the building trades continue good; the open weather during the past month has advanced winter operation work materially. Operators are busy, and even at the closing of the open season mechanics are scarce.

There has been a marked increase in two-family two-story dwelling house operations during the year, particularly in the West Philadelphia district. Samuel Shoemaker begins operations almost immediately on 22 houses of this type on Catharine street, between Sixtieth and Sixty-first streets, at a cost of about \$133,000. These will be 18 ft. 6 in. x 77 ft. and contain the usual modern improvements.

The Board of Education has received bids for several school buildings during the month, awards for which have not yet been made. These include a four-story school house, 112 x 279 ft., at Third and Mifflin streets, to cost \$400,000, a six-division building at Fifty-eighth and Willow avenue, and a 21-division building at Thirteenth and Grange streets. The buildings will all be of brick, stone, steel and concrete, from plans prepared by J. Horace Cook, architect, Land Title Building.

The transfer of a piece of property 92 x 92 ft. on South Penn square, opposite the Public Building, will result in the early construction, it is stated, of a 20-story office building on the site. It is also understood that plans are in preparation for the erection of a 20-story office building on the site of the present Mint Arcade Building, Chestnut below Broad street, which is now occupied by a smaller building.

The John D. Allen Company, architects, will erect for the Realty Improvement Company a large apartment house at Emlen and Quincy streets, Germantown, containing 48 housekeeping apartments and costing about \$300,000.

Pittsburgh, Pa.

The building situation in November made a rather better comparative showing than had generally been expected by those actively engaged in the industry. While the gain over 1911 was slight yet it was nevertheless

most gratifying. According to the figures of the Bureau of Building Inspection there were 244 permits issued for construction work costing \$694,329, while in November, 1911, there were 283 permits issued for new buildings, alterations, etc., \$639,148.

The number of new buildings planned in November last was 96, estimated to cost \$513,756, and of the new work authorized 44 were of brick, 34 of brick veneer, 14 frame, 2 of tile and 2 of ironclad construction. The Second Ward led in point of cost, with an expenditure placed at \$194,500, which included the theatre to be built in Oak Alley. As regards the number of operations the Thirteenth Ward came first, with 23 operations involving an outlay of \$90,500, this being the first time in several years that that district has headed the list.

Portland, Ore.

While contractors have been looking for a revival in building the official record for November is the lowest since January, 1910. The total valuation of buildings for which permits were issued was \$679,955, compared with \$1,040,410 in October and \$2,046,785 in November, 1911.

The Friberg Contracting Company has the general contract on the new city jail, which will cost about \$200,000. It will be a six-story steel frame building, having a concrete mat under it to resist water pressure from the river at high water.

H. L. Pittcock is building a \$50,000 stone and concrete residence on Imperial Heights, about 900 ft. above the city.

One of the largest jobs in prospect is the Pittcock block, a six-story Class A office building, for which plans are being drawn by Architect David C. Lewis. A 12-story Class A building to cost about \$700,000 is also planned to replace the old Marquam Building, which collapsed, Doyle, Patterson & Beach being architects for the new building. A six-story reinforced concrete office and store building is to be erected at Third and Yamhill streets, J. Dantoff, architect.

Sacramento, Cal.

Building activity shows no curtailment, the official records for November showing a total of \$404,757 compared with \$385,378 for October and \$325,533 for November of last year. Notwithstanding the lateness of the season dwelling construction is as active as ever, while new plans for business structures are coming out at a satisfactory rate.

Among the principal buildings for which permits were taken out were the Y. M. C. A. building, Ransome Concrete Company, contractor, valued at about \$130,000, and a \$65,000 apartment house on N street, near Twelfth. One firm in one day took out permits for 17 houses of an average value of \$2,150. The largest contract let recently was for the Travelers' Hotel, taken by the Ransome Concrete Company at about \$230,000.

Plans have been accepted for a seven-story concrete building on the old site of the Farmers' & Mechanics' Bank to cost about \$200,000.

The general contract for the union high school, Lodi, Cal., has been let to Arthur Arlett, San Francisco, at \$125,290.

San Diego, Cal.

The local situation is less interesting at present than for some time. The amount of work in progress is far greater than last year at this season, but the record for November is a little below the year's average. Permits were issued in November for buildings valued at \$746,221 compared with \$884,319 for October and \$602,305 for November, 1911, which was considerably lower than for the corresponding month of 1910.

Among the principal buildings for which contracts have been let recently are a three-story concrete hotel at First and F street to the Chaffey Concrete Company and a \$100,000 apartment house at Front and Ivy streets to the W. E. Keir Construction Company.

Architects Quayle Bros. & Cressey will soon have plans ready for an \$80,000 school at Coronado and a \$75,000 addition to the San Diego County hospital.

San Francisco, Cal.

Permits were issued in November for buildings valued at \$1,912,932 compared with \$1,617,890 for November, 1911. For the same month of 1910 the total was only \$992,258. Notwithstanding the increase of interest in dwellings the greatest gain in valuation was for permanent construction. In reviewing the contracts let and plans figuring it is hard to say what class of buildings predominates, as factory, warehouse, retail and office buildings are receiving much more attention than last

year, while the hotel and apartment types are about holding their own. Full steel frame buildings are comparatively few, though some structural steel is used in most of the brick buildings.

While some items of lumber, steel and hardware are still advancing a little the material market has on the whole changed but little in the last month. If spring activity is up to anticipations, however, several materials of coast manufacture are fairly certain to be higher by next summer. Local wholesale lumbermen have adopted a new list and hope to maintain prices on a steadier basis next year. The practice of sending "random cargoes" of northern lumber to this market, which has in the past tended to disturb values, may be abolished. Increased competition in the lime and cement market is assured by the installation of a new plant south of this city. Brick manufacturers are keeping their output down to legitimate requirements, though the potential capacity is far beyond the needs of this district.

Manufacturers of California sugar and white pine door stock report an unusually heavy demand for Eastern shipment at present. They say that in the San Francisco market this material has been very largely replaced by Oregon and Washington fir doors, which are now used almost exclusively in apartment houses and often in private dwellings. This is attributed partly to the low price of the Northern stock and partly to its attractive grain, which is equally adapted to stain or natural color wax finish. For painting and artificial graining the sugar and white pine doors are preferred. Redwood doors produced in northern California find their greatest popularity around Los Angeles, where natural redwood finish has become a fad.

Owing to the slow delivery of structural steel the city has decided to take figures on steel for the new city hall as soon as possible on a tonnage basis.

An interesting job in connection with the Civic Center construction will be the removal of the Commercial High School, a large steel frame brick building, from this site to the public library lot nearby. Bids for the work were called for early this month.

Segregated contracts have been let for the Starr King School, amounting to \$57,445.

Several fine churches are to be erected here in the near future and the Southern Pacific Railroad has officially announced its plans for a new passenger station at Third and Townsend streets to cost over \$600,000. The main building will be 100 x 100 ft., two stories high. It will be of reinforced concrete, in the Mission style.

Among the principal buildings now figuring or to be figured shortly are the following: The five-story Class A Labor Temple, to cost about \$100,000, O'Brien & Werner, architects; a six-story brick hotel at Ellis and Jones streets, to cost about \$80,000, Smith & Stewart, architects, and an eight-story hotel at Jessie and Fourth streets, to cost \$100,000, Wm. Curlett & Son, architects.

On November 7 the General Contractors' Association of the city assembled at a banquet given by the associate members. R. G. Graham acted as toastmaster, and with the aid of various members who furnished entertainment kept interest up to a high pitch.

Scranton, Pa.

A healthy increase in building operations over the corresponding period of 1911 is manifested in the figures which are available covering the respective periods. In November last the building operations, for which 61 permits were issued by Superintendent E. L. Walter of the Bureau of Building Inspection, involved an expenditure of \$154,260 as against \$121,625 in November, 1911.

Seattle, Wash.

Builders are pursuing the even tenor of their way and the amount of work being planned is of about the same volume as was the case in the same month of 1911. There were slightly less number of buildings for which permits were taken out, and the amount involved is a trifle under November of the year before, but the first 11 months of 1912 are ahead as regards capital involved. The report of Superintendent R. H. Ober of the Department of Buildings shows that in November last 676 permits were taken out for building improvements having a valuation of \$403,310. In November, 1911, there were 687 permits taken out for work costing \$449,105. Of the totals for November 97 permits were for detached residences costing \$182,075 as against 98 dwellings costing \$132,435 in November, 1911. Frame construction was considerably ahead of the year previous, there having been in November 239 permits issued for this class of work estimated to cost \$329,475, while in November, 1911, there were 216 permits for frame construction involving an outlay of \$154,490.

For the eleven months of 1912 there were 9251 per-

mits issued for construction work valued at \$7,446,975 and in the first eleven months of 1911 there were 10,404 permits taken out for construction work valued at \$7,164,266. The first eleven months of 1912 show 1708 detached residences to have been planned, calling for an outlay of \$2,650,270 as compared with 2031 residences costing \$2,742,880 in the first eleven months of the year before.

St. Catharines, Canada.

The leading contractors of the city recently organized a Builders' Exchange with officers for the ensuing year as follows:

President.....Charles Chapman
Vice-President.....John Davis
Secretary.....Thomas Mesler
Treasurer.....William Leach

An executive committee of five members was also appointed together with two auditors.

St. Paul, Minn.

At the annual meeting of the Builders' Exchange held in this city December 3 the following officers for the ensuing year were chosen:

President.....F. H. Romer
First Vice-President.....J. H. Hoffman
Second Vice-President.....Olag Swanson
Treasurer.....O. Lampland
Secretary.....A. V. Williams

The feature of the meeting was the address of the retiring president, John A. Seeger, who has been president of the exchange for the past two years and who declined re-election. Mr. Seeger dealt with various phases of the work of the Exchange and gave particular attention to the subject of industrial education. He stated that the organization had succeeded in having training of that nature extended into practically every grade school. The attendance at the night industrial classes, he stated, showed a marked increase over the preceding year, due to the interest taken by employers in seeing to it that the proper instructors were named for the classes in order that the instruction might be along practical lines. Continuing he among other things said:

"I believe that this organization should go on record in advocating: First, that adequate buildings be provided for children attending the grade schools so that a full day's schooling can be had by any child desiring same. Second, that the present buildings used for grade schools should be put and maintained in proper and sanitary condition. Third, that increased facilities should be provided for giving instruction in manual training and domestic science in the grade schools, so that the greatest opportunities possible may be available for acquiring practical instruction on subjects which will train the boy and the girl to be industrious and helpful. Fourth, that no increased expense, either for buildings, grounds, maintenance or equipment should be incurred in connection with the high schools until the improvements and additions named in the first, second and third items are obtained."

The report of Secretary A. V. Williams showed the organization to be in a flourishing condition.

Toledo, Ohio.

The city has been holding its own in a most gratifying manner in the matter of building construction as compared with the previous year, and the 11 months of 1912 are something like a million dollars ahead of the corresponding period of 1911. In November the Building Department issued 132 permits for building construction valued at \$272,270 compared with 102 permits in November, 1911, having a valuation of \$197,915.

For the first 11 months of 1912 there were 1933 permits issued for buildings valued at \$5,181,318 as against a valuation in the first 11 months of 1911 of \$3,580,779. The total valuation of new work and repairs for 1911 was \$4,058,188, thus showing that the first 11 months of the year just closed were more than a million dollars ahead of the entire 12 months of the year before.

James Knox Taylor, until recently supervising architect of the United States Treasury Department, has been appointed head of the Department of Architecture at the Massachusetts Institute of Technology, succeeding the late Professor Constant Désiré Despradelle.

(For Builders Appliances and Equipment see second page following.)

BUILDERS' APPLIANCES AND EQUIPMENT

Some Things of Seasonable Interest to Those Having
to Do with the Building Business

New Plant of the Milwaukee Corrugating Company

An important event to the sheet metal industry and building interests in general is the completion of the new home of the Milwaukee Corrugating Company of Milwaukee, Wis., into which the owners are now moving and making preparations to handle the large volume of business booked for spring delivery.

Starting about ten years ago, the Milwaukee Corrugating Company thought it had made provision for space that would be adequate for its requirements for a long period, but the rapidly increasing business made necessary a change and for the past year great care and a liberal expenditure of money have been developing a plant that can safely be said to be as perfect and complete as modern methods can make it.

In the new factory will be installed special automatic machinery to be used for manufacturing the company's lines of crimp-edge gutters, interlock conductor pipe, titelock shingles, invisible joint metal ceilings, one-piece elbows, mitres, Kuehn's Korrekt kut-offs, conductor hooks, eaves trough hangers, etc.

The new plant, as will be seen by the bird's-eye view in

and provided with a metal eye for hanging it upon the wall. The first sheet carries conspicuously displayed in colors the trademark of the company, while below is the name of the concern with the statement that it presents its 1913 calendar "with hearty good wishes for prosperity."

Each sheet is printed in colors, with an appropriate design occupying the upper portion, while the calendar proper appears below, together with the name and various addresses of the company. The second sheet of the calendar is that for December, 1912, and carries in addition to a winter scene a photo-reproduction of the reinforced concrete Plymouth Building at Minneapolis, Minn., in connection with which Universal Portland cement was used. The remaining sheets constitute the calendar for 1913, and at the top of each, in connection with the color design, is the picture of a piece of work in connection with which Universal Portland cement has been used. The list embraces in the order named the reinforced concrete grain tanks of the Erie Railroad at Chicago; a concrete road in Wayne County, Detroit, Mich.; a viaduct in Highland Park, Ill.; a garden wall of cast concrete in Minneapolis, Minn.; a reinforced concrete coaling station



Fig. 1—Bird's-eye View of New Plant of Milwaukee Corrugating Co., at Milwaukee, Wis.

Fig. 1, is of steel and brick construction, with sawtooth roof. Skylights and windows are liberally provided, thus arranging for a maximum amount of light and air.

The power house and offices are separated from the main building, both being carefully planned and arranged for the purposes intended.

The company will have a floor space of 250,000 sq. ft., enabling it to carry a much larger stock than ever before. This feature, together with the excellent facilities to manufacture sheet metal products of practically every description, will serve to increase the efficiency of the trade by taking care of their requirements and demands without hesitation or delay.

Located on the tracks of both the C. & N. W. and C. M. & St. P. Railways, and having 4,000 ft. of trackage, the movement of freight both in and out can be performed most expeditiously.

The Milwaukee Corrugating Company feels that it is prepared to and will demonstrate what capacity, service, experience and minimum manufacturing cost can do to promote the welfare and success of its patrons.

A Handsome 1913 Calendar

One of the first calendars for the new year to reach our desk, and one which is of a high order of artistic merit, is that being sent out by the Universal Portland Cement Company, Chicago, Ill. It consists of a series of sheets measuring 12 in. wide and 20 in. long, bound at the top, which is the narrow way, with a metal strip

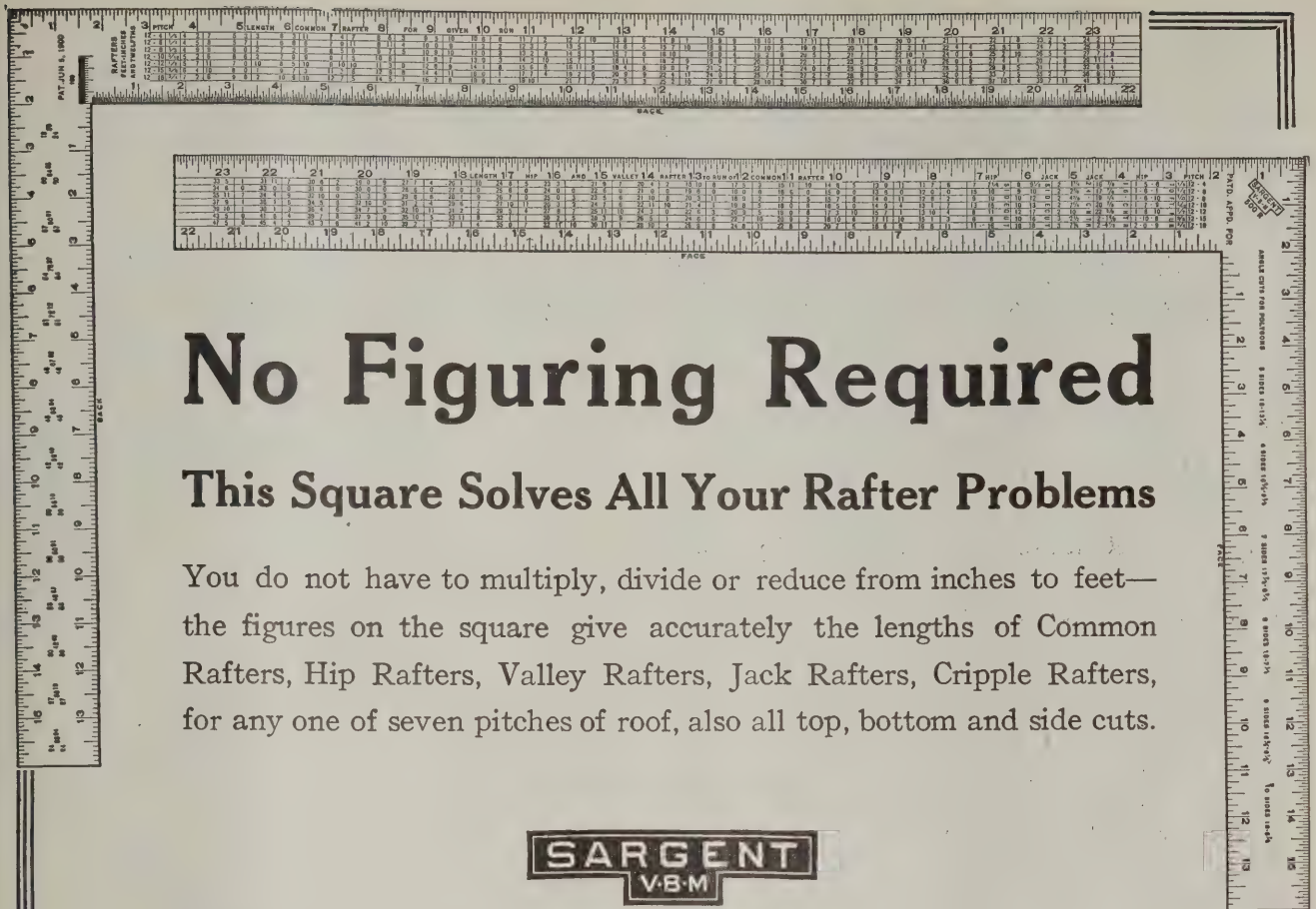
at Sir John's Run, W. Va.; the government lock and dam at St. Paul, Minn.; a reinforced concrete residence at Evanston, Ill.; a flour mill at Winona, Minn.; a pattern storage building of the General Electric Company at Erie, Pa.; a reinforced concrete department store at Dayton, Ohio; the Larimer Avenue Bridge at Pittsburgh, Pa., and the Normal Park Methodist Episcopal Church in Chicago. The make-up of the calendar is exceedingly neat and artistic, and is of the most pretentious character of any thus far received.

Carborundum Products for the Woodworking Trades

There has just been issued from the press by the Carborundum Company, Niagara Falls, N. Y., a very attractive 34-page catalogue of abrasive products for the woodworking trades. Bound in paper covers, it is profusely illustrated, and in connection with the various lines of output brief descriptive text is given, thus rendering clear the more salient features to which the company desires to direct attention. Among the early pages is a bird's eye view of the company's plant in 1893, contrasted with that in 1912; photographic views of several of the company's distributing depots, including that in London, England, and fac-similes of various medals awarded the company for its product at important expositions.

In the make-up of the catalogue attention is first given to the description of North River Garnet used by the com-

(Continued on page 50)



No Figuring Required

This Square Solves All Your Rafter Problems

You do not have to multiply, divide or reduce from inches to feet—the figures on the square give accurately the lengths of Common Rafters, Hip Rafters, Valley Rafters, Jack Rafters, Cripple Rafters, for any one of seven pitches of roof, also all top, bottom and side cuts.

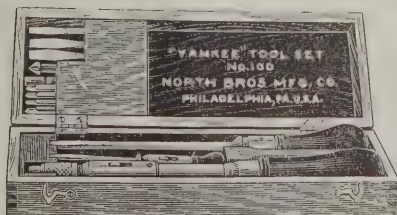
SARGENT
V.B.M.

Rafter and Framing Square

is an invaluable tool and time-saver for busy mechanics. Errors are avoided as the figures on the square are guaranteed to be accurate.

For full description see the Sargent Square Booklet, sent free on request. Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics, sent on application.

Sargent & Company, Manufacturers, 1153 Leonard St., N. Y.



No. 100—\$4.50



No. 60—65c



No. 1530—\$2.80



No. 12—60c



No. 65—1", 95c; 6", \$1.10

The Best Gift

for most any man

is a YANKEE Tool

Our Tool Book tells you all about thirty-four kinds of labor-saving tools, ranging in prices from 25c to \$5.00 each, any of which will make a most acceptable Christmas gift to any man (or boy). They last for years and your little act of kindness is recalled every time the tool is used. Try it this Christmas. Your dealer sells them.

Send for the book, anyway. It's free.

North Bros. Mfg. Co.

LEHIGH AVENUE
Philadelphia, Pa.



Stanley's Ball Bearing BUTTS

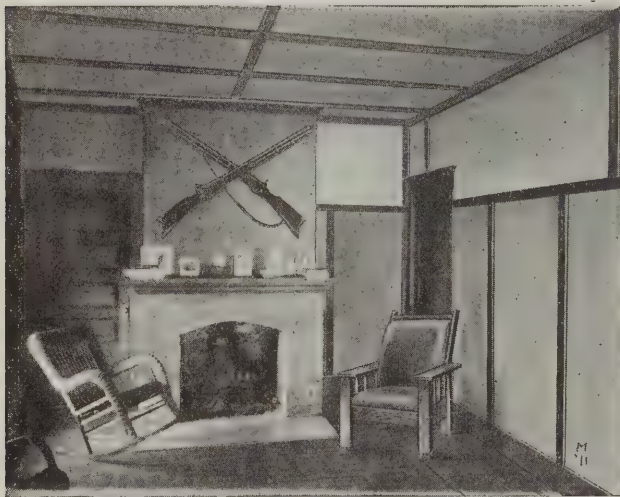
INSURE PERFECTLY HUNG DOORS

Friction is eliminated by the steel bearings, and the door swings smoothly and softly without creaking or binding. These butts have

NON-RISING PINS

which will not work out of the joint.
Write for artistic and instructive booklet "Properly Hung Doors."

Department "E"
THE STANLEY WORKS
NEW BRITAIN, CONN.



When price
is a consideration, use

Roberds Ideal Wall Board

It costs much less than lath and plaster and is easy to put on. Saves time, labor, dirt, confusion, money and disappointment. Makes a beautiful interior which can be painted, kalsomined or papered. Lasts forever and is proof against vermin, heat, cold, fire and water. Does not peel, crack, chip, sag or warp.

Roberds Ideal Wall Board comes in sheets all ready to be nailed to the studding. Your cheapest man can apply it. Your customer will be delighted because it means a better job for less money.

Write today for catalog, samples and testimonials from other contractors.

THE ROBERDS MFG. COMPANY

101 Railroad Street

Marion, Indiana

pany in the manufacture of its carborundum brand garnet paper, cloth and combination paper-cloth. This species is said to be noted for its hardness, sharpness and purity. Interesting tables of sizes and prices of Garnet paper and cloth are given, followed by a statement of the characteristics of grinding wheels. There is also a list of grits and grades of wheels for various classes of grinding in the woodworking plant.

Not the least interesting matter in the catalogue is the reference to carborundum and to carborundum sharpening stones for woodworking tools. These stones are illustrated, and in connection with them are given tables showing the numbers by which they are known, their size and price. Carborundum Niagara grinders fitted with carborundum wheels occupy several pages at the close of the catalogue.

We understand that any carpenter, woodworker or other mechanic having occasion to make use of sharpening stones or grinders, can obtain a copy of this catalogue by making application to the company.

Stanley Corner Bit Braces

The Stanley Rule & Level Company, New Britain, Conn., and 100 Lafayette Street, New York City, has supplemented its line of fine bit braces by adding two styles

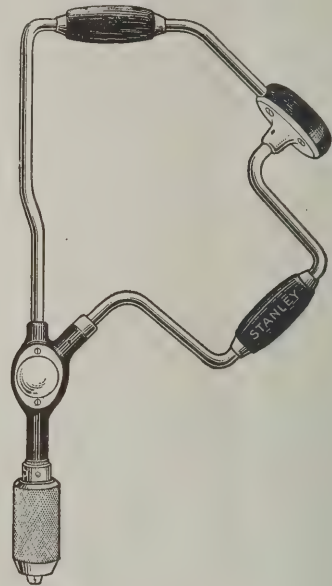


Fig. 2—Stanley Corner Bit Brace, with Universal Jaw Chuck, No. 993

each of Stanley corner bit brace Nos. 992 and 993 and the Stanley corner ratchet bit brace Nos. 982 and 984. The corner bit brace No. 993, illustrated in Fig. 2, is made in 8 and 10-in. sweep. For corner work, when using a bit of ordinary size, the work can be more easily and rapidly done because of the shape of the frame, which steadies the bit and enables the workman to turn the brace continuously instead of partially, as when using an ordinary ratchet brace. The braces have metal-clad, ball-bearing heads, and the heads and both handles are made of cocobolo. The chuck quill is fastened to the head by three screws, one of which goes through that part of the frame where it enters the head, securely fastening all three together. The gears are of machined steel, the gear teeth are carefully cut, and the whole mechanism enclosed, which protects the working parts from dirt and also guards the user's hand. The

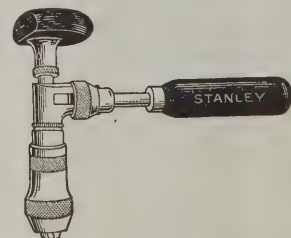


Fig. 3—Stanley Corner Ratchet Bit Brace, with Alligator Jaws, No. 984

jaws of the universal pattern are recommended for both wood and metal workers, as they hold round shank bits and drills from $\frac{1}{8}$ to $\frac{1}{2}$ in. and taper shanks as large as

(Continued on page 52)

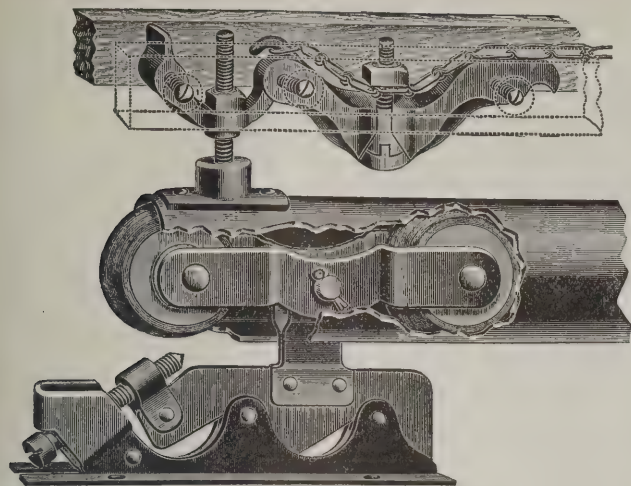


Fig. 404.

Correctly Hung Doors are the Last Touch of Perfection

Cannon Ball Hangers insure *permanent* satisfaction. Both hanger and track easily adjustable with an ordinary screw driver, and both are instantly accessible from the center of the door opening, allowing either end of track to be raised or lowered as desired.

The CANNON BALL House Door Hanger

Specially formed wheels with roller bearings—wide tread—leather covered. Frictionless, noiseless, practically indestructible. Steel hanger and plate for attaching to door.

Track of 14 gauge steel, $2\frac{1}{4}$ " inside diameter, slotted $\frac{1}{4}$ " on under side.

Furnished complete with two-piece hardwood header.

Write today for Special Circular and full particulars.

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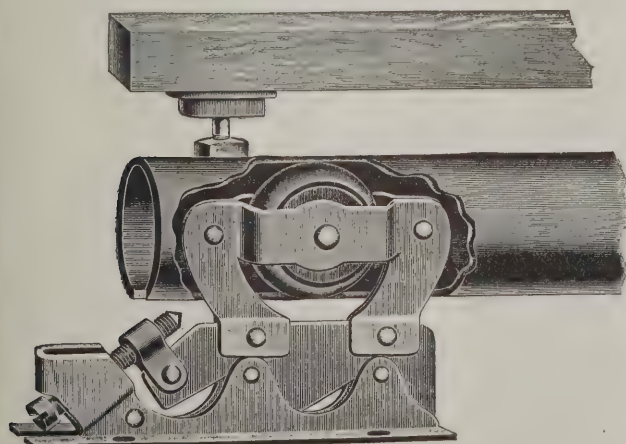


Fig. 468.

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Is the Money Always There?

Your special training—or lack of it—hits you right in the money pocket. With everything but the salaries of untrained men going

up, with competition becoming keener all the time, with the many wants that each day brings, and the time when there'll be nothing coming in—with all these conditions staring you in the face, you've got to decide mighty quick whether you're a success or not—and if not, how you can make friends with success and bid failure "good-by."

It's a serious proposition when you stop to think about it—this big spending and little earning. Yet, it needn't worry you one bit if you can increase your earning capacity far beyond your spending requirements. It's simply a matter of

making your brain work instead of your body. Head work earns more than body work. You've got some good ideas—and you know it. The International Correspondence Schools will help you turn those ideas into cash.

Select from the attached coupon the well-paid occupation you like best, mark the coupon as directed and mail it today. That's all you have to do to learn how the I. C. S. can train you at home and in your spare time—no matter where you are, what you do, what your age. If you can only read and write, the way is open.

Don't worry as to how the I. C. S. can help you. The I. C. S. have already helped so many other ambitious men that they surely can do the same for you. The I. C. S. remove all obstacles—make everything easy—smooth the road.

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Structural Eng.	Mechanical Eng.	Bookkeeper
Structural Draftsman	Mechanical Drafts'n	Stenographer
Plum. & Heat. Con.	Stationary Eng.	Advertising Man
Supt. of Plumbing	Electrical Engineer	Window Trimming
Foreman Steam Fit.	Electric Lighting	Commere' Illustrat'g
Plumbing Inspector	Electric Railways	Civ. Service Exams.
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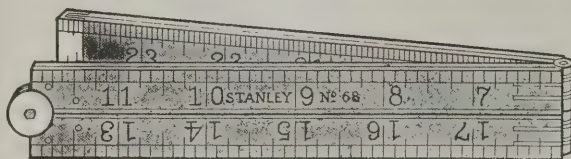
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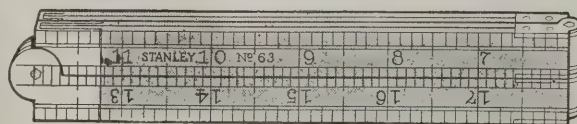
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Present Occupation _____

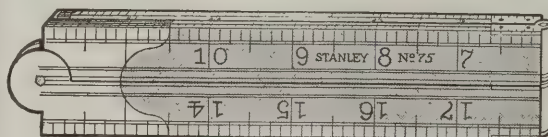
Stanley Tools



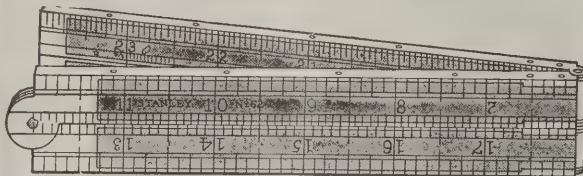
ROUND JOINT.



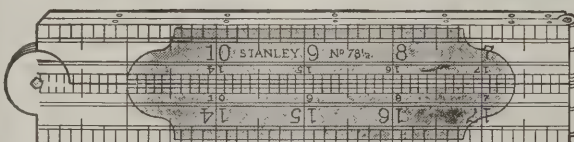
SQUARE JOINT.



ARCH JOINT.



SQUARE JOINT—FULL BOUND.



DOUBLE ARCH JOINT—FULL BOUND.

BOXWOOD RULES

THE value of a Rule consists not only in its being made of correct length and with accurate graduations but also in its liability to remain correct.

The Stanley Rule is made by such improved methods that it is originally absolutely correct. The fact that all Boxwood used in the Stanley Rules is sawed into shapes, and left to season from eighteen months to two years before being made into finished Rules, insures against change, and herein lies our claim for the superiority of the Stanley Rule over all others.

In Rules, as in all tools, a saving in the first cost is not an economy. A Double Arch Joint Bound Rule, for instance, while it costs only say five times as much, will outlast a dozen Round Joint ones, and will be a source of satisfaction to its owner all the time.

Insist that your dealer furnish you with STANLEY BOXWOOD RULES, thereby securing a Rule that is guaranteed by a Company that have been manufacturing Carpenters' and Mechanics' Tools for over fifty years.

We should like to send you our complete catalogue of "STANLEY TOOLS." Address

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

on a No. 2 Clark's expansion bit. The jaws are drop forged, machined and have springs for automatic release. All metal parts are nickel plated. The No. 992 is the same design of brace except that it has a chuck with interlocking jaws.

The Stanley corner ratchet bit brace is intended especially for electricians, plumbers and gas-fitters, but it is a handy tool for many other mechanics who have occasion to work close up in corners or in other inaccessible places where there is no room for an ordinary corner brace.

The knurled ring between the head and the rest of the mechanism, operated with the thumb and finger of the hand holding the head, is for the purpose of starting and holding the bit until it is far enough in the wood so that it will not reverse when the handle is turned back. This brace is made in two numbers, No. 982 having interlocking jaws and No. 984, shown in Fig. 3, having jaws of the alligator type. Both styles of jaws are drop forgings, machined, and have springs for automatic release. The head is ball bearing and both head and handles are of cocobolo. The peculiar shape of the head, which is partially cut away, enables the mechanic to place the brace close up to horizontal or perpendicular surfaces, a great advantage over the old form of head. All metal parts are nickel plated.

Machinery and General Contractors Supplies

A most interesting catalogue of 78 pages relating to general contractors' supplies and machinery is that which has been issued for the season of 1913 by the Chicago Builders' Specialties Company, Old Colony Building, Chicago, Ill. The catalogue commemorates the eleventh anniversary of the company's business existence and the point is made that a most complete line of contractors' specialties is constantly carried in stock. The goods illustrated and described cover a wide range, embracing practically everything that the contracting builder is likely to require in the way of machinery and supplies. There are hoisting apparatus, metal lath, corner beads, reinforcing material for concrete work, derricks of various kinds, stone crushers, pumps, bar benders, wheelbarrows, carts, wall ties and plugs, silo forms, etc., etc. The entire make-up is neat and attractive and the catalogue will be found of special interest to every builder who is desirous of keeping abreast of the times in the way of outfits used in his line of business.

Saws for Making Slotted Joint in Window Sash

There are doubtless many readers of this journal who are interested in combinations of saws for making slotted

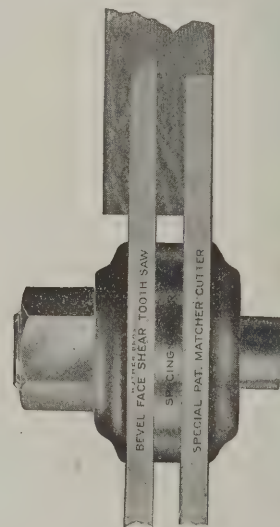


Fig. 4—Saws for Making Slotted Joint in Window Sash

joint in window sash as turned out by Huther Brothers Saw Mfg. Company, 2500 University Avenue, Rochester, N. Y., and what is here presented cannot, therefore, fail to attract their attention. The saws made for this class of work are special. The one used for cutting the cope is fitted with shear teeth so as to make a clean cut in end grained stock. Next to the saw is placed a spacing collar, clearly marked in the illustration, and then comes the patent tooth matcher cutter at the right to cut the rabbet. By using the company's special matcher cutter it is possible to set the bevel sections slightly, thus doing away with any chance of the cutter burning the stock. Fig. 4

(Continued on page 54)

*We wish you all
a happy and prosperous
New Year*

HENRY DISSTON & SONS

INCORPORATED

Keystone Saw, Tool, Steel and File Works

PHILADELPHIA

Pearson's Automatic Shingle Nailer

Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. Throw nails in by the handful—holds about 600 nails—start nailing. Nails can be driven through tin or quite heavy sheet iron.

Made in two sizes:
The BLUE Nailer for 3d common No. 14-gauge wire nails.

PAYS ITS COST ON ONE JOB

The RED Nailer for 3d galvanized No. 13 gauge 1½-inch wire nails. Order through your dealer or sent prepaid for \$5.00.

Money refunded if not as represented
PEARSON MFG. CO.
Robbinsdale, Minn.

INTRODUCTORY TRIAL OFFER

If the SELF-SETTING PLANES are not sold in your town and you write us saying "I saw your trial offer in Building Age," we will send you particulars, a carpenter's pencil and our \$1.00 Certificate, which we will receive as \$1.00 in payment for a SELF-SETTING PLANE as stated in our \$1.00 Certificate, and if this S. S. Plane is unsatisfactory and returned to us at our expense, we will send you \$1.00 more than you sent us, as the \$1.00 Certificate says.

None Cheap but the Best.

All want the Best.
Sent on 30 Days' Trial as per Circular B.
Dealers do not keep it.



O. K. ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained, eaty, knurley, knotty, hard or soft wood you can find. THAT IS FREE FROM SAND OR DIRT. If it is not worth to YOU, OR YOUR MEN, TWICE ITS COST, return it at our expense as above stated. If you send us the addresses of ten carpenters, no matter where they live, we will send you another hard, tough carpenter's pencil. Give the SELF-SETTING PLANE a chance to PROVE ITS WORTH. If it FAILS, return it and we will return your money. GAGE TOOL CO., Vineland, N. J.

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of all kinds ready for quick shipment.

2 light 59c up
4 light 64c up
12 light 71c up

\$1060 We will furnish complete all lumber, millwork, hardware, spouting, paint—everything except masonry and labor to build this 8-room house, and include plans free. Design A135.

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Catalog and handsome illustrated Book of Modern Plans—shows floor plans, etc. Tells you how to save 33½% to 50% on all Building Material, Lumber, etc. Get these 2 big books at once—today.

Quality, safe delivery and satisfaction absolutely guaranteed.

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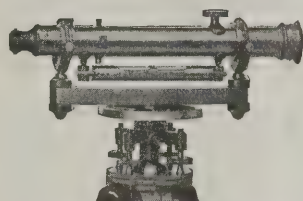
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HAND MADE RUGS
Braided, Woven, Drawn-hooked Rag Carpet Old Chintz, Patch Work.

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WHITE'S IMPROVED LEVEL

*Don't delay, send for catalog now.
Our Levels are Guaranteed.*

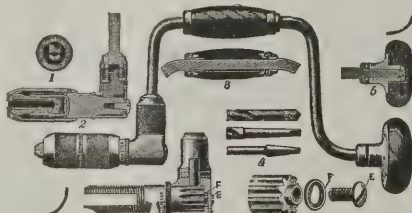
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Milwaukee, Wis.



The Carpenter Says: The MASTER BRACE

is his idea of what a brace ought to be. It delights the lover of fine tools. Metal parts are handsomely nicked and head and handle are of cocobola. The chuck securely holds, straight shanks from 1/4 to 1/2 inch, and all styles and sizes of bits, tapers, and irregular shaped shanks. The milled jaws have eight sharp holding points, giving unusual tenacity of grip. **A Distinct Masterpiece in its every Function**

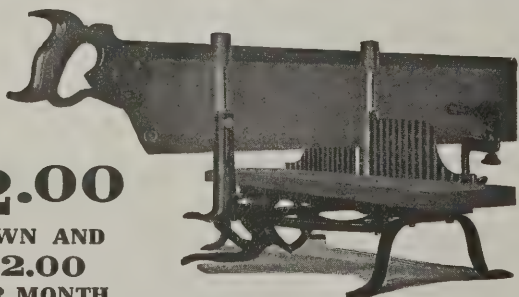
The positive ratchet device protects the parts from dust. Has ball bearing head and center handle.



The Master Brace is made in 4 sizes—8, 10, 12 and 14 inch sweep. Send for our **Free Book "Tool Practice."**

Millers Falls Company

28 Warren Street,
New York



\$2.00
DOWN AND
\$2.00
PER MONTH

This is our easy payment plan. This Box formerly sold for \$12.50. Now, \$8.95 cash—or \$10.00 on payments. These prices include saw. We have other bargains in tools. Send for catalogue.

We sell direct to carpenters, giving you the benefit of the middle man's profits.

CROWN TOOL MFG. CO., Ottumwa, Iowa

of the illustrations shows the way that the work is done on a shaper; in fact, this being regular shaper work when the special cutters are used.

In doing this work on an ordinary saw table it is simply necessary to make a chuck consisting of a block of wood 10 in. long, 8 in. wide and 4 in. thick, with a hole in it that will just hold the sash molding. The molding is then placed in the chuck in an upright position and passed over the saws.

In order to do the work on a tenoning machine the cutters are first placed on a loose sleeve and the latter is attached to the cope spindle of the tenoning machine.

In the woodworkers' edition of the Company's Catalogue No. 32, a full description of its patent matcher cutter is given, together with illustrations showing the different styles of special grooving and rabbeting that can be accomplished by means of its patent groover or dado head. A copy of this catalogue will be sent to any reader of the paper who may make application for it.

The Atha Nail Hammer

A hammer of such construction that the carpenter and builder may pull with it from the toughest wood headless nails has just been placed upon the market by the Atha Tool Company, Newark, N. J. The hammer is properly balanced and is carefully forged from high grade pure steel. Each hammer is thoroughly tempered and handsomely finished. The handle is made from the best white hickory, while the head of the hammer is so made that it will grip the shank of a nail so that it may be drawn out even though it has no head. This kind of a hammer is put out under the Atha Horseshoe Brand, and the makers have taken every care to render it especially desirable as an adjunct of the carpenter's "kit" of tools.

The "Simonds Saw" Calendar

A poster calendar which strikingly illustrates one of the many merits of the saws made by the Simonds Mfg. Company, Fitchburg, Mass., is being widely distributed by that enterprising concern. The poster measures 13 in. in width by 20 1/2 in. in height, and consists of a heavy piece of cardboard provided with a loop for suspending it upon the wall. The greater portion of the poster—that is, a space measuring 10 in. in width by 13 in. in height—is taken up with a panel picture printed in colors representing a veteran carpenter holding in both hands a Simonds saw, which he is bending in a sharp segment of a circle, thus demonstrating its flexibility. He is represented as saying at the same time, "I tell you it's a great saw." The picture is reproduced with remarkable fidelity as to detail, and the expression upon the face of the old carpenter is one of great satisfaction.

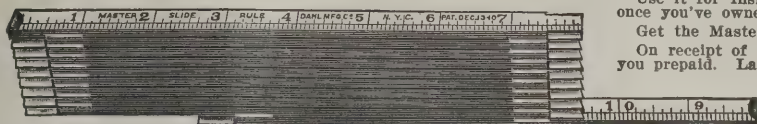
The calendar proper consists of a series of leaflets printed in white letters and figures upon a very deep green ground work. In connection with the days of the week and month are the various phases of the moon. The thirteenth leaflet comprises what is usually termed a "counting house calendar," showing all the months of the year upon it.

Across the center of the poster and in bold lettering in colors are the words "Simonds Saw." At the bottom of the poster is the name of the company, together with the cities in which its branches are located. Across the border the business is conducted under the name of Simonds Canadian Saw Company, Ltd., with offices in Montreal, Province of Quebec; Vancouver, B. C., and St. Johns, New Brunswick.

Information on Concrete Reinforcing Material

A booklet recently brought out by the Berger Manufacturing Company, Canton, Ohio, relating to the above subject, is of more than ordinary interest to the architect, the builder and the engineer. There are three different types of reinforcing material covered in the booklet, these being rib-trus, ferro-lithic and multiplex reinforcing and furring plates. Following the title page is given a descriptive synopsis of these products and illustrations showing the material fastened in place on the purlins and partially concreted. Next in order is a general index giving only the pages included in each section, so that the reader may determine what type of plate is best adapted to his needs and immediately refer to the pages describing that plate. The sections are arranged with rib-trus first, with its own individual title page, index and instruction, and after this ferro-lithic and multiplex, in the order named, and with the same arrangement as the rib-trus section. Another point which makes the catalogue of special value to the reader is the fact that every possible subject on

The Master Slide Rule



You can't get along without the Master Slide Rule and have perfect convenience and perfect work. Think of a moderately priced pocket rule that extends six feet, with all the accuracy of a calliper!

Use it for Inside Measurement or otherwise—you'll find it indispensable once you've owned one.

Get the Master Slide Rule at your dealer's. If he hasn't it, write us.

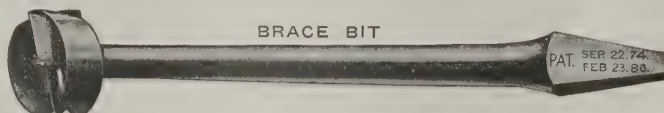
On receipt of 15c per lineal foot, a 4, 5 or 6 foot rule will be sent to you prepaid. Large profits to agents. Write for circulars and particulars.

DAHL MFG. CO., 1 East 42d St.
New York City

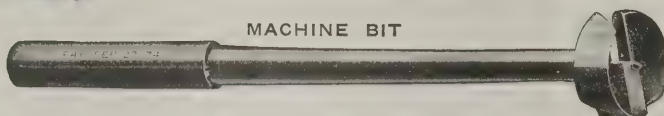
The "FORSTNER"

Labor Saving Auger Bit Bores Any Arc of a Circle

As it is guided by its circular rim instead of its centre, and can be guided in any direction.



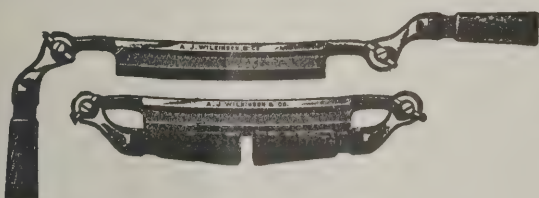
MACHINE BIT



Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wood working and against difficult grain and knots. Special prices in full sets.

THE PROGRESSIVE MFG. CO.,

Torrington, Conn.



USE OUR

Folding and Adjustable Handle Draw Knife

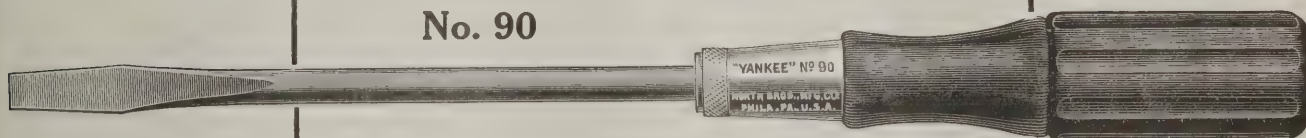
It is adjustable to any position, adaptable to awkward places, absolutely rigid when set, handy and compact, a time-saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

WRITE FOR PRICES AND DISCOUNTS

A. J. WILKINSON & CO., 180-188 Washington St., Boston, Mass.

"Yankee" Plain Driver

No. 90



No. 90
STANDARD STYLE
14 Sizes

No. 95
CABINET STYLE
11 Sizes

A strong, durable, and well balanced tool, of the same high quality as other "Yankee" Tools which to-day are without equal. The blade and ferrule are highly polished, the handle of hardwood finished in dull black, making a handsome appearance. Each tool is thoroughly tested and the blades are positively guaranteed not to turn in the handle.

NORTH BROS. MFG. CO.

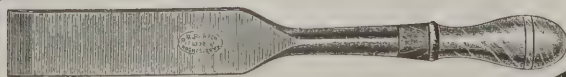
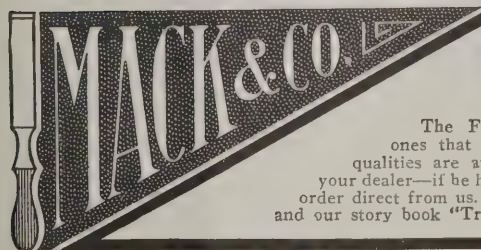
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PHILADELPHIA, PA.

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"YANKEE"
Tool Book

A postal brings it



The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them, in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

Brown's Race
Rochester, N.Y.



THE PLAN SHOP BUNGALOWS

designed for NORTHERN CLIMATES, combine the artistic beauty of California bungalows with the utility of the Northern homes.

The designer is a Californian and knows the bungalow by heart.

The book is bristling with interest and suggestion for all home makers. It embodies successful, compact arrangements, popular and economical story and half designs, roomy two-story homes of character, and cozy camps and lodges, built for \$200 and up.

Price, including 16-page supplement, Fifty Cents. Supplement alone, Ten Cents.

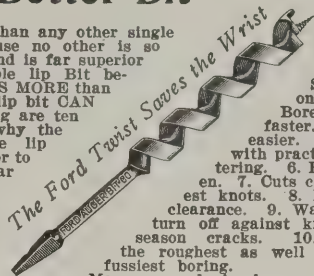
ROLLIN A. TUTTLE, Architect

P. O. Box 3242, Boston, Mass.

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The FORD Bit is a bit Better Bit

It is better than any other single lip bit because no other is so well made, and is far superior to any Double Lip Bit because it DOES MORE than ANY double lip bit CAN do. Following are ten reasons why the FORD Single Lip bit is superior to a regular double lip bit.



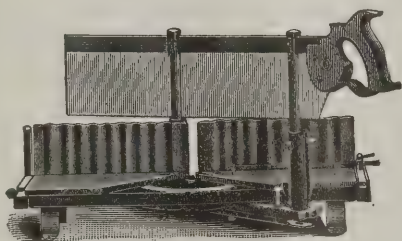
1. Bore end grain.
2. Screw draws in on any wood.
3. Bore considerably faster.
4. Bore 40% easier.
5. Cuts out with practically no splintering.
6. Easier to sharpen.
7. Cuts clean the toughest knots.
8. More room for clearance.
9. Warranted not to turn off against knots or across season cracks.
10. Adapted for the roughest as well as the finest, fussiest boring.

May we send circulars and memo book? Free if you address Dept. 3g.

Ford Auger Bit Company, Holyoke, Mass.

Goodell Mitre Box

Made of STEEL—Cannot Break
First in Quality and Improvements



Automatic Stops for holding up saw.

Corrugated Backs Graduated.

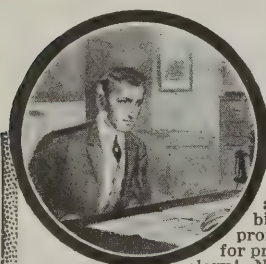
Gauge for Duplicate cuts and many other features.

If you want the best you will take no other.

Send for Circular K.

GOODELL MFG. Co., Greenfield, Mass.

This Way to A Bigger Salary



You can't wish yourself into a better job! You've got to have **knowledge**—and you must act to get it. Go after the big jobs! Let us train you in whatever profession you choose. Let us prepare you for promotion, for a better job and a bigger salary! No matter what your condition is, if you

can read and write, we can help you. Just mark and mail the coupon below—to-day—NOW! We will show YOU the way to a bigger salary!

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Our Short, Complete Home Study
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In Plan Reading, Estimating, Architectural Drawing,
House Planning, General Contracting, etc.

Students study plans of buildings actually being constructed. Leading Chicago contractors and architects approve your work. Regular and short courses offered. Complete outfit free to students. Low tuition. Study at home in leisure hours. Remember, the home study work is the same as our college day and evening classes. We give both resident and correspondence courses. State which you want.

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Mark and Mail this Coupon NOW!

Make
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CHICAGO TECHNICAL COLLEGE, 679 Athenaeum Bldg., Chicago, Ill.
Gentlemen: I have marked with a cross (X) the branch or branches interesting me. Please tell me how I can qualify for a good, well-paying position.

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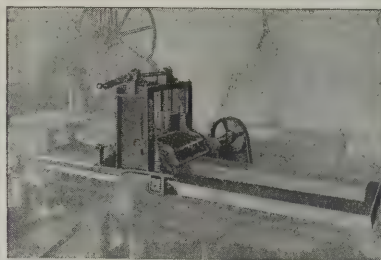
Town _____ State _____

Resident or Home Study Course _____

reinforcing materials is covered. First there is a general description, then information concerning centering, full particulars on roofing, concreting, waterproofing, plastering, walls and siding, partitions, suspended ceilings, flooring, stucco finish, table of safe loads, maximum spans, specifications, installations, etc. The catalogue is so arranged as to render it of special interest and value to those engaged in concrete work, and will prove an important addition to the library of any one interested in the subject.

Improved "Famous" Universal Woodworker

The Sidney Tool Company, Sidney, Ohio, points out that the small contractor as well as the average carpenter and builder of the present day are well posted on the rela-



Improved "Famous" universal woodworker.—Fig. 5—One of the attachments.

tive merits of the Universal Woodworker compared with individual machines, and they cannot, therefore, fail to be interested in the new Improved Famous "30" Universal Woodworker which it has just brought out, as this, the latest model, marks a big advance over its predecessors. The statement is made that over 1300 of the company's previous models are in use, which is a fair criterion of the popularity of the "Famous" line. In what appears below are a few specifications of this new machine so that carpenters and builders may be able to judge to what extent the needs of the trade have been studied and the requirements met.

The machine has great rigidity and durability by reason of the fact that the frame is cast integral—not bolted, as is the frequent practice in connection with Universal Woodworkers.

Sixteen different kinds of work can be done on the Famous "30" when equipped with a full set of attachments. The machine "stripped" is a combination of five machines, viz., band saw, jointer, saw table, shaper and borer, all of which can be operated at the same time. These are really complete machines in themselves, being operated independently of each other. This allows five men to work at one time. The only difference between this equipment and five single machines is that, in the "Famous" five machines are combined on one frame, while in the ordinary manner, each machine has its own frame, which necessitates additional floor space, pulleys, shafting, etc.

In addition to the five machines described, extra equipment can be furnished which enables sixteen different kinds of work to be performed. The extra attachments



Fig. 6—Another attachment of the new improved "Famous" universal woodworker

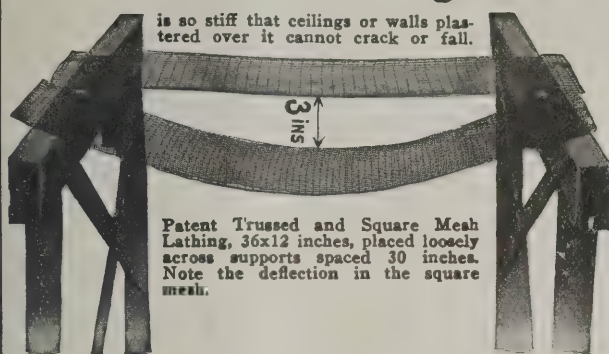
can be fitted to the machine in an incredibly short time and give exactly the same effect and satisfaction as a machine built expressly for the purpose. Thus, for instance, a planing attachment, a sanding attachment, (drum or disc), a hollow chisel mortising attachment, etc., can be fitted to the machine in a few minutes, and the work performed without any waste of time. Some of these attachments are shown in Figs. 5 and 6.

Connelly Construction Company, 705 Fannin Street, Houston, Texas, is desirous of receiving copies of catalogues from advertisers of the *Building Age* who manufacture or deal in building materials of all kinds.

(For Trade Notes see second page following)

Please quote BUILDING AGE when writing to advertisers.

Greening's Trussed Steel Wire Lathing



is so stiff that ceilings or walls plastered over it cannot crack or fall.

Patent Trussed and Square Mesh Lathing, 36x12 inches, placed loosely across supports spaced 30 inches. Note the deflection in the square mesh.

And of greater importance to builders, the "scratched coat" can be worked on easier, has a surer grip and cannot be scraped off, as is possible with other forms of lathing.

It will sustain a load of $3\frac{1}{2}$ times greater weight than any square mesh cloth of similar weight per square foot.

Requires no furring, as it can be nailed directly to studs or joists.

Greening's Patented is the Lathing that lasts.

Learn full details and begin to effect big savings at once.

Grimm's Galvanized Corrugated Wire Lathing.

Buffalo Crimped Wire Concrete Reinforcing.

Wire Cloth and Wire Work.

BUFFALO WIRE WORKS CO.

(Formerly Scheeler's Sons)

New York Office: 30 Church St.

Main Office and Works, 446 Terrace, BUFFALO, N. Y.

BEAVER BOARD



The walls and ceiling of this library in the home of Mr. F. S. Green, Nashville, Tenn., are made entirely of Beaver Board.

Know Beaver Board as Thoroughly as You Know Lumber

It is a pure fibre product, it is used, handled and put up like wood.

It is essentially a proposition for carpenters and builders.

It is rapidly displacing lath, plaster and wall-paper for walls and ceilings of every type of building new and remodeled.

It offers a big and growing field for skilled craftsmanship and business opportunity.

Drop us a line and we will tell you how to start things in your community. Illustrated series of talks on "The ABC of Beaver Board Construction" sent free.

The Beaver Companies

United States: 190 Beaver Road, Buffalo, N. Y.
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THE YANKEE A Compound Level

Just the thing for a Builder.

Accurate—Low Priced.

FROST-ADAMS CO.

37 Cornhill, Boston

Send for our catalogue

Building, Roofing and Insulating Paper

A Line of All Goods suitable for the Hardware and Building Trades

Paper, Boards, Glue, Special Paper
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SAMPLES AND PRICES SENT ON REQUEST.

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TILE Unglazed, Encaustic, Ceramic, and Vitrified Tile

For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches and wherever Durable and Sanitary Floors are required. Also for Fireplaces.

STAR ENCAUSTIC TILE COMPANY

Bluff St., near Gist St., Pittsburgh, Pa.

WET PROCESS CONCRETE BLOCKS

By the PETTYJOHN SYSTEM

The manufacturing of Concrete Blocks is rapidly nearing perfection, but the up-to-date manufacturer must use modern machinery and employ improved methods. Three features are important in perfect block making:

Wet Process

Face Down

Damp Curing

These splendid features are combined in the new Pettyjohn Invincible Machine and no other. Made in three lengths, 16", 24" and 40". Tandem Invincible makes two blocks at once, price \$65.00 and up. Single Invincibles, \$35.00 and up. Sold on trial always, guaranteed to give satisfaction or money refunded.

With our TRIPLE TIER RACKING SYSTEM green blocks can be stacked three high direct from machine with inexpensive home-made rigging. This economizes space, reduces off-bearing distance and above all insures slow, even, damp, perfect curing and bleaching. Plans and blue prints free to customers.

Send for our latest edition of "Stone Making" (just published), a book of valuable data for the block maker—FREE.

THE PETTYJOHN COMPANY, - - 616 N. 6th Street, Terre Haute, Ind.

You Can't Make 'Em Rust!



Neverust Brand Galvanized Nails

have for half a century held the lead with the marine trade of the continent. They are all that the name implies—Hot Dipped Galvanized—Smooth and Free from skin cutting edges. They cost no more than the shoddy kind.

The blame for defective work, Mr. Builder, is laid at your door. Your customer expected a rust proof Nail when he specified Galvanized. If your Nails rust there is bound to be complaint. The dealer may have been imposed upon or he may have deceived you. You can call him to account. But in the meantime you have a dissatisfied customer.

You can avoid such difficulties by insisting on our NEVERUST BRAND HOT GALVANIZED NAILS. They will outlive the job. Write for booklet.

Wilcox, Crittenden & Co., Inc.
Middletown, Conn. (Established 1847)

Lay Your Own Concrete

AS the forests are cut, builders turn to concrete. Concrete construction is not difficult. It pays liberal profits. Hundreds of contractors are going into concrete every year. You can start with a small investment—some wheelbarrows, shovels, small tools and a

Smith Hand Mixer

IT is a *batch mixer*, guaranteed to mix a perfect batch in three slow, easy turns of the drum. Cranks easily—popular with the men. Batch capacity, $2\frac{1}{2}$ cu. ft. Output, 25 to 30 cu. yards per day. Weight, 1000 lbs. Guaranteed fully by the biggest and oldest mixer concern in the United States.

The T. L. Smith Co.
1327 Majestic Building
Milwaukee, Wisconsin

Let us send you our
guarantee and booklet
No. 11



TRADE NOTES

The United States Gypsum Company, 205 West Monroe Street, Chicago, Ill., reports a very gratifying reception of its product at the hands of the trade, and each month during the year just closed showed a greatly increased tonnage over the corresponding months of the year before with an unusual demand for plaster board and gypsum tile. The company now has 37 plants in operation, scattered over a territory extending from New York on the east to River Falls, Mont., on the west.

C. A. P. Turner, the well-known inventor of the Turner mushroom system of reinforced concrete construction, has established branch offices and agencies in Danville, Va.; Vancouver, B. C., and in Holland, Belgium, Australia and New Zealand. We understand that his system has been used in more than 30 buildings recently erected in Winnipeg, Manitoba, and in 10 buildings now under way in Moose Jaw, Sask.

Lane Brothers Company, Livingston street, Poughkeepsie, N. Y., will send a copy of its catalogue of trolley parlor door hangers and track to any architect or builder who may make application for it. The merits of the various lines of hangers made by this company are set forth and illustrations are given showing the various styles which are available.

Davis Acetylene Company, 180 Crawford street, Elkhart, Ind., asks the builder and contractor why he does not equip the home or other building he is erecting with Davis acetylene lighting. The claim is made that he can greatly increase his income by selling and installing this system of lighting in new buildings and during the dull seasons in buildings already erected. The cost of equipping a building as well as terms to salesmen are obtainable from the company on application.

Chicago Technical College, 679 Athenaeum Building, Chicago, Ill., directs attention to its complete home study course in architecture and building construction, architectural drafting, house planning, estimating, general contracting, etc. The point is made that these courses are thorough and that the students study plans of buildings actually being constructed, and at the same time their work is approved by leading Chicago contractors and architects. The announcement is made that complete outfits are free to students.

The various issues of the "Lightning Line" which are being distributed by the J. A. Fay & Egan Company, 221 to 241 West Front Street, Cincinnati, Ohio, contain a great deal of interesting information relative to leading lines of woodworking machinery turned out by this enterprising concern. Not only are illustrations of machines presented, but there are interior views of manufacturing establishments in which machines of the company have been installed. A sample copy can be secured by any reader of the *Building Age* who makes application to the company for it.

The Niagara Falls Metal Stamping Works, makers of hardware specialties, Niagara Falls, N. Y., are erecting a one-story fireproof building for housing a plant for pickling steel, a tinning plant, japanning ovens and furnaces for case hardening, annealing and tempering springs of all kinds. The contractors expect to have the building ready for occupancy the latter part of December.

The Leader Water System is the subject of a very interesting catalogue which is being sent out by the Leader Iron Works, Decatur, Ill., and Owego, N. Y. The catalogue gives full specifications relating to this water system, as well as illustrating complete outfits which may be sold during the winter months and installed when the weather permits. Catalogue "E" relates to tank price list and Bulletin E-3 to gasoline storage.

American Sheet & Tin Plate Company, with general offices in the Frick Building, Pittsburgh, Pa., lays special stress upon its copper-bearing open-hearth roofing tin and points out that every builder should have a copy of the Pocket Reference Book which it has issued. Those who are interested can secure full information regarding metal roofing and siding as well as tin plates, galvanized sheets, etc., by writing the company.

James F. Hobart, a frequent contributor to this journal, and recently an inventor and designer in the research department of the Diamond Match Company, Barberton, Ohio, resigned his position on December 5 to become superintendent of the Hanna-Breckenridge Company, Fort

(Continued on page 60)

It's the Mesh That Makes the Plaster Stick

KNO-BURN METAL LATH is built right and priced right. It is absolutely fireproof, never disintegrates, does not buckle or sag on wide spacing.

KNO-BURN METAL LATH is manufactured from United States Standard Gauge sheets. It is furnished plain, coated with highest quality electrolysis proof paint, or galvanized after expansion with the best grade of prime Western Spelter.

The mesh of KNO-BURN METAL LATH "keys" it to the plaster. That's why it never comes off. We can give you plenty of other reasons why you ought to specify

KNO-BURN **Expanded Metal Lath**

Send for our Booklet 45 on "Stucco Houses" and Booklet 43 giving you details about Metal Lath in General and KNO-BURN in Particular.

We publish a monthly bulletin called "Expanded Metal Construction." We should like to send it to you regularly if you cared for it. Send us your name and we will put it on our mailing list.

NORTH WESTERN EXPANDED METAL CO.

904 Old Colony Building, Chicago, Ill.
Largest Exclusive Manufacturers of Metal Lath in the World.

The Builder Who Uses Utility Wall Board Is the Builder Who Makes the Money



Utility Wall Board is a tough fibre board put together with two insulations of natural waterproof asphalt, rolled under tremendous pressure into one solid compact sheet and surfaced on both sides with special moisture proofing.

It is the only Wall Board made under this Scientific Moisture Proof Process.

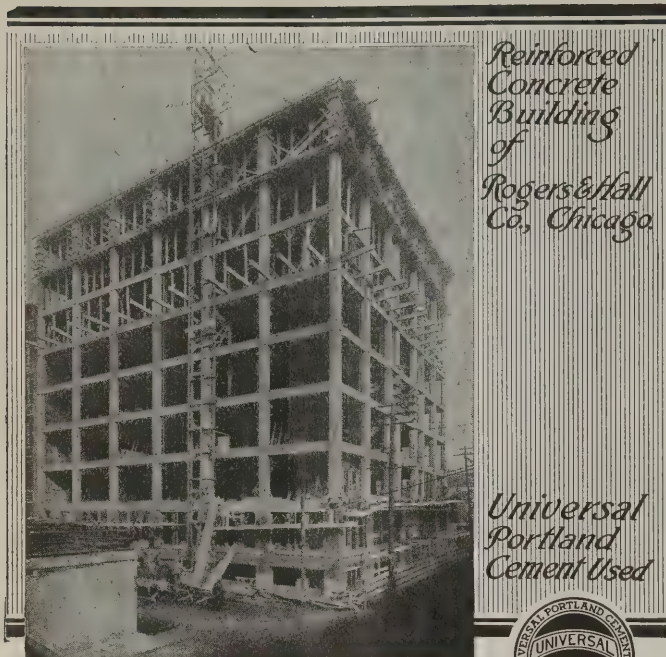
UTILITY WALL BOARD

Takes the place of both lath and plaster. It is easy to put on. Makes a wonderfully tight smooth wall and ceiling and lasts as long as the house stands. There is no muss or dirt in putting it on. You don't have to wait for it to dry. It can be decorated in any way that you could decorate a plaster wall. And it costs less than lath and plaster.

We want to send the booklet and a free sample to every carpenter and builder in the country. Write for yours.

THE HEPPE'S COMPANY, 4501 Fillmore St., Chicago, Ill.

Please quote BUILDING AGE when writing to advertisers.



*Reinforced
Concrete
Building
of
Rogers & Hall
Co., Chicago*

*Universal
Portland
Cement Used*



UNIVERSAL Portland Cement Co.

CHICAGO - 72 West Adams St.
PITTSBURGH - Frick Building
MINNEAPOLIS - Security Bank Bldg.

ANNUAL OUTPUT 12,000,000 BARRELS
PLANTS AT CHICAGO AND PITTSBURGH

Wayne, Ind. Mr. Hobart assumed his new position on December 9, and will be busily engaged in systematizing and introducing improved methods in the largest machine shop in the world devoted to the rebuilding of wood-working machinery and the manufacture of hollow blast grate bars.

The Joseph Dixon Crucible Company of Jersey City makes the interesting announcement that the selling price of their silica-graphite "One Quality Only" paint is reduced. They say they make this reduction because the decrease in the price of linseed oil, which is used as the vehicle, enables them to do it, and because it is their aim at all times to give their customers any benefit possible in reduction of price of materials. This well-known paint, which has been the standard for nearly fifty years with leading railroads and manufacturing plants as a maintenance paint, is a long service protector of all exposed steel and metal surfaces.

Gem Ventilator Company, 200 Summer Street, Boston, Mass., has been sending out a circular dealing with the window ventilator attachment which it makes in various sizes to fit all sorts of windows. The circular presents some interesting information regarding the attachment, together with prices.

American School of Correspondence, Chicago, Ill., makes a very flattering offer to carpenters, contractors and builders, the details of which are set forth in another part of this issue. The offer relates to the Cyclopedia of Architecture, Carpentry and Building, which consists of ten volumes—4760 pages—which will be sent express prepaid for seven days' free examination. With every order for a Cyclopedia will be included a new Plan Book containing hundreds of suggestions besides 108 plates covering plans for every style of modern American home from the medium-priced cottage to the most palatial city residence; also a large variety of ten houses, garages, apartment houses, libraries, churches, etc. Another free offer which is made is a year's consulting membership entitling the purchaser of the Cyclopedia to the free advice of a corps of expert architects. This gives practical help in handling building problems which are too specific to be taken up in detail in the Cyclopedia.

"Beaver Board" is the subject of an announcement made by the Beaver Companies, 190 Beaver road, Buffalo, N. Y., wherein the merits of the product are set forth and the statement made that it is essentially a proposition for carpenters and builders. It affords a big and growing field for skilled craftsmanship and is applicable to every type of building, whether it be new or old. An illustrated series of talks on "The A. B. C. of Beaver Board Construction" can be obtained by any interested reader by making application to the address above.

The Canton Metal Ceiling Company, 1946 Harrison avenue, Canton, Ohio, directs attention to some of its new designs of sheet metal work in the shape of shingles and tile, which are referred to as a "revelation in roof ornamentation." The present assortment which the company is offering embraces new, up-to-date patterns and any architect or builder sending sketches will receive from the company drawings and estimates as to the work in question. A catalogue sent out by the company affords an excellent idea of the various lines which it offers.

G. & H. Barnett Company, Philadelphia, Pa., has issued an interesting catalogue relating to the various lines of files which it manufactures, and a copy of which will be sent free to any interested reader who may make application. The files of this concern have been awarded prizes at various important expositions and the goods have established for themselves an enviable reputation in the trade. The company was established in 1863 and was incorporated in 1895.

F. W. Bird & Son, 112 River street, East Walpole, Mass., suggest to interested readers that they send for a sample of their waterproofed wall board which is finished in plain and quartered oak. It requires neither painting nor papering and is delivered in a finished state ready to put on the walls.

Northern Hemlock and Hardwood Manufacturers' Association, Wausau, Wis., are distributing an attractively printed brochure carrying plans with interior and exterior views of houses in connection with which birch is used for the interior finish. The statement is made that birch finish insures lasting satisfaction, harmonizes perfectly, and is "the logical wood," being suitable for all interior work. The designs of houses shown are of a varied nature and the little work cannot fail to prove of interest and value to every architect, builder and house owner into whose hands a copy may come.



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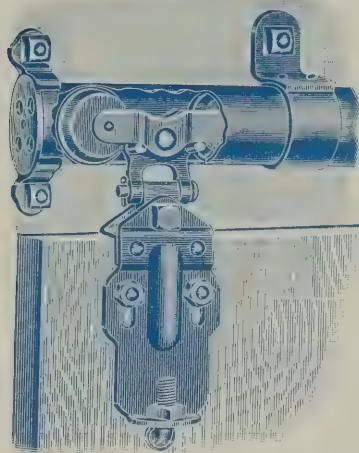


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THE BUILDING AGE

FEBRUARY, 1913

A MODERN TWO-ROOM SCHOOL HOUSE

A Feature of This School Building Is the Auditorium
on the Second Floor

THE various halftone engravings, elevations, plans and miscellaneous constructive details appearing upon this and the pages which follow relate to a modern two-room school house which is especially adapted for erection in suburban districts or in small communities where the requirements are not large. It

floor, showing the platform end, is presented in one of the small halftone engravings. The other small picture represents a detail of the main entrance to the building. The two large interior views show the arrangement of desks in the class rooms.

According to the specifications of the architects the



Photographic View of a Modern Two-Room School House at Wayne, Ill.—Architects, Postle & Fischer, 1732 Marquette Building, Chicago, Ill.

is of brick veneer construction for the main story and in half timber effects above the belt course and in the gables. For the rural districts, where a less expensive structure might be required with much the same floor arrangement, the entire building might be of wood.

An inspection of the main floor plan shows the position of the various cloak rooms, closets, etc., the location of the registers and air ducts, together with that of the stairs leading to the second floor, which is devoted to an auditorium. A partial view of this

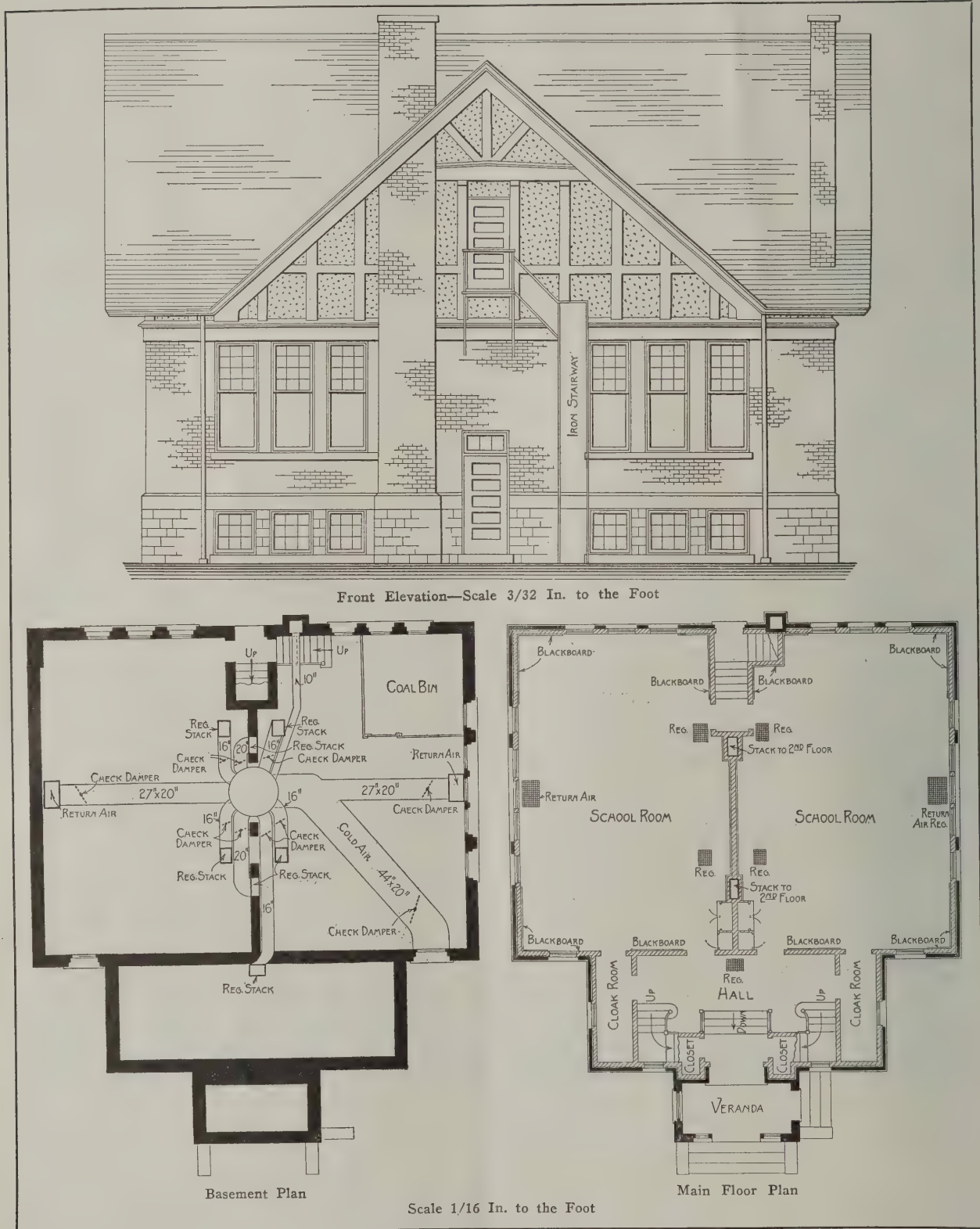
foundation walls are of stone and where exposed above the grade line are of rock-faced limestone laid up in courses. Good lime mortar mixed with Portland cement in the proportion of two-thirds lime mortar to one-third Portland cement was used. The outside of the basement walls from the footings up to the grade line is plastered with Portland cement mortar mixed in the proportions of one part cement to three parts sand, spread evenly over the surface and troweled smooth. The chimney is of brick with terra cotta flue lining extending from

just above the entrance of the smoke pipe up to the top. Above the roof the chimney is of faced brick.

All cut stone is of Buff Bedford finished with a smooth rubbed surface.

The floor joists are No. 1 Georgia pine and span the full width of each room supported on the wooden partition dividing the two rooms and on a 1 x 6-in. ribbon for the outside walls. The bearing partition

placed 16 in. on centers. All partitions, including the studding of the outside walls, have a 2-in. plate on the bottom and the bearing partitions have a double plate on top. The studding are doubled around all openings and in the bearing partitions are trussed overhead. The partition in the basement around the coal bin has a 2 x 4 stud frame covered on the outside of bin with 1 x 6-in. dressed and matched hemlock.



A Modern Two-Room School House at Wayne, Ill.

through the center of the building and along both sides of the stairway to the basement is of 2 x 6-in. Georgia pine placed 16 in. on centers. All other inside partitions are 2 x 4-in. No. 1 hemlock, while the partitions for the outside walls are of 2 x 6-in. No. 1 hemlock

The headers and trimmers are doubled around the stairs and thoroughly spiked together.

The floor joists are bridged twice in the width of the span with 1 x 4-in. cross bridging securely nailed at each end. The inside partitions are bridged once in

the height of the story with 2-in. block bridging.

The rafters are 2 x 6-in. No. 1 hemlock placed 16 in. on centers. These are covered with hemlock flooring 6 in. wide and $\frac{7}{8}$ in. thick placed 2 in. apart. The ridge boards are $\frac{7}{8}$ in. thick and 6 in. wide. The ridge underneath the last layer of shingles is flashed with Giant insulating paper. The roofs of the building and veranda are covered with Extra Star "A" Standard red cedar shingles laid $4\frac{1}{2}$ in. to the weather and securely nailed with 4-penny nails, two to each shingle.

The rafters of the veranda are 2 x 6 in. placed 24 in. on centers and covered with sheathing boards the same as the main roof. The ceiling joists are also 2 x 6 in. placed 24 in. on centers and covered on the inside with 4 x $\frac{7}{8}$ -in. spruce dressed, matched and beaded and finished with a $1\frac{3}{4}$ -in. cove molding at the angle.

The exterior framework is covered with sheathing and on this in turn is placed Giant insulating paper made by the Standard Paint Company, 100 William

fastened in place, to which the plaster is applied. The timber work in the gables is of 2 x 8-in. plank, rabbeted on the back edges to receive the plastering.

The space covered by the blackboards in the classrooms is covered with No. 27 expanded metal lath, securely fastened in place and given two coats of "Imperial" cement plaster, the last coat being floated to an even surface. All the walls and ceilings of the rooms are plastered on white pine lath with joints broken every seventh course.

An examination of the sectional elevation on another page will show that the cellar or basement extends only under half of the building. This part has a concrete floor about 4 in. thick, the concrete being mixed in the proportions of one part Portland cement, three parts Torpedo sand and five parts gravel. The concrete floor is finished with a top dressing of cement mortar $\frac{1}{2}$ in. thick troweled smooth.

The floor of the front veranda and steps, as well



A Modern Two-Room School House—View Showing a Gable End and the Rear of the Building

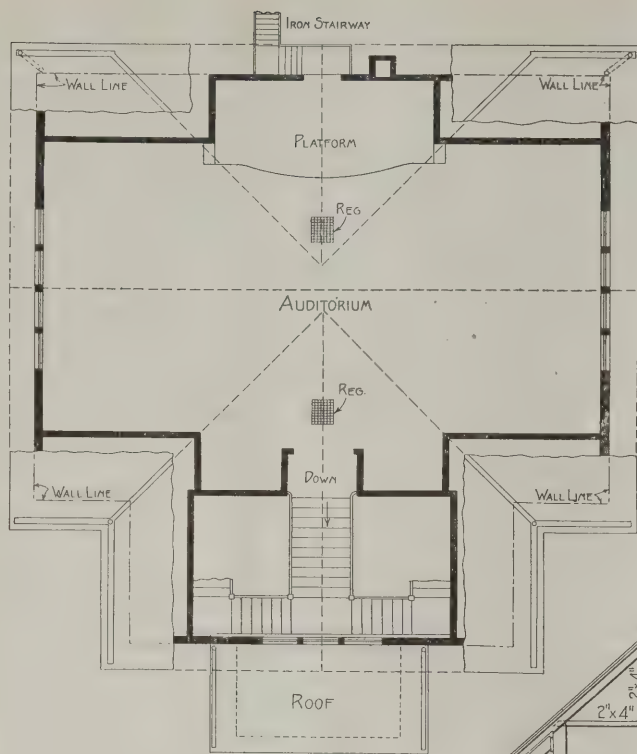
Street, New York City. One thickness of heavy deafening felt is also placed between the floors of the first and second stories.

The framework of the main story of the building is veneered with a paving brick laid up in joints of colored mortar struck hollow. The pillars of the veranda are faced on all sides with these brick and filled solid on the inside with common brick bonded together with headers every seventh course. The brick veneer is anchored to the sheathing with metal clips every sixth course and placed 24 in. on centers.

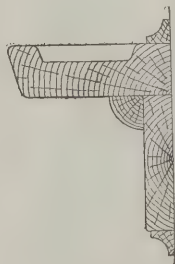
The plastered gables and walls, where so indicated on the elevations, are furred with 1 x 2-in. strips placed 16 in. on centers on top of the sheathing and then are covered with No. 18 galvanized wire lath, securely

as the rails at the end of the steps, are of concrete, the same as specified for the basement floor, and finished with cement mortar. Each step is reinforced with two $\frac{1}{2}$ -in. rods running its full length and terminating in arms at the end with a right-angle bend. The step at the front doors is of concrete reinforced with three $\frac{3}{8}$ -in. rods. The veranda floor is reinforced with $\frac{3}{8}$ -in. rods placed 12 in. on centers and running in both directions. The basement floor is placed on a bed of 6 in. of boiler cinders.

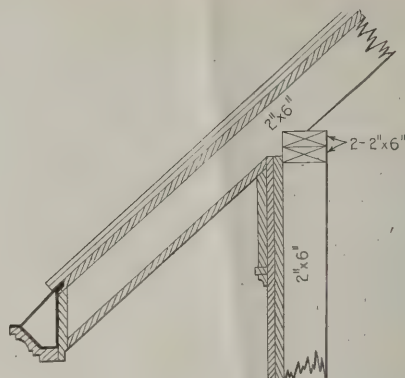
The gutters are of No. 26 galvanized iron securely fastened to the roof sheathing. The valleys are lined with N. & G. Taylor's "I.C." tin 16 in. wide with a V-shaped ridge down the center, and put together with liquid soldered joints. The valleys were painted on



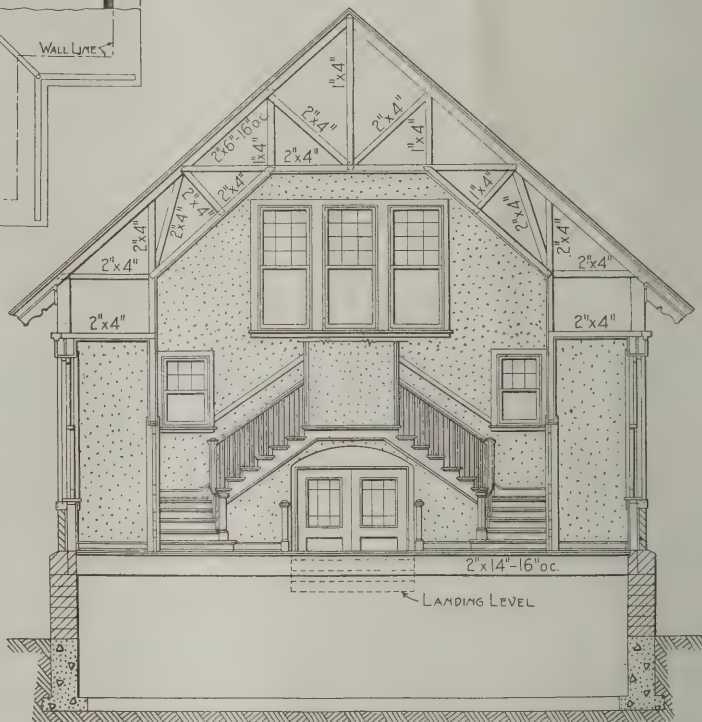
Plan of Second Story Showing Auditorium
Scale 1/16 In. to the Foot



Section Through Chalk Tray—Scale
3 In. to the Foot



Detail of Main Cornice—Scale 1/2 In. to
the Foot

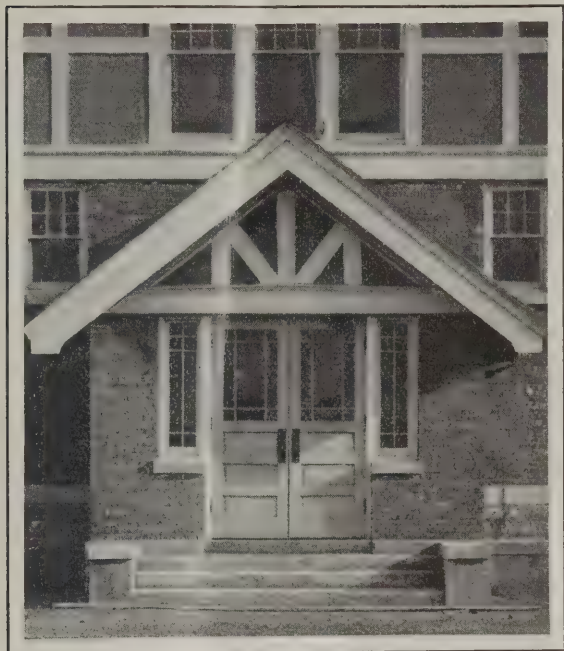


Vertical Cross Section of Building Taken Through the Entrance Hall and
Looking Toward the Main Stairs



Rear Elevation Showing Outside Iron Stairway from the Auditorium—Scale 3/32 In. to the Foot

both sides with a heavy coat of red lead and oil before they were put in place. The down spouts are 3-in. corrugated galvanized iron, connected to the gutter at the top and cemented in the sewer tile at the bottom. The



Detail of the Main Entrance

pine. The newel posts are 6x6 in. with molded cap and base, and the balusters are 1½ in. square, set three to each tread. The platform on the stairs is also of maple.

All the trim for the finished parts is 4½ x ¾ in. thick, plain and mitered at the corners. The windows are provided with molded stool and apron, and all windows and doors have a molded stop which, on the windows, is fastened into place with screws.

All the doors have plain and molded panels, the rails and stiles being veneered on pine cores.

Underneath the blackboards is a chalk rail, a section through which is shown in the details presented herewith.

Just within the entrance to each classroom—one being shown at the right and the other at the left of the partition dividing the two rooms,—is a bookcase having glass doors above the countershelf and panel doors below ¾ in. thick. The shelves are adjustable, supported on notched strips. Beside each bookcase is a teachers' wardrobe.

The closets underneath the stairs are fitted up with three shelves 12 in. wide, while the cloakrooms have two rows of hooks for wearing apparel.

The first and second stories have a finish floor of 2¼ x 7/8-in. maple.

The doors to the veranda as well as the front doors to the building are hung with three 4½ x 4½-in. bronze butts to each door. The doors to the veranda are each provided with a suitable check and spring.

All interior doors are hung with two 4½ x 4½



View in Class Room at Right of Partition Looking Toward the Entrance Hall and Showing Arrangement of Desks, Etc.

A Modern Two-Room School House at Wayne, Ill.

flashing and counter-flashing around chimneys and where the veranda roof joins the main building is of N. & G. Taylor's "I.C." tin and were painted on both sides before being put in place.

The stairs from the first to second floor and the steps at the entrance have maple treads 1¾ in. thick with a molded nosing and risers ¾ in. thick of Georgia

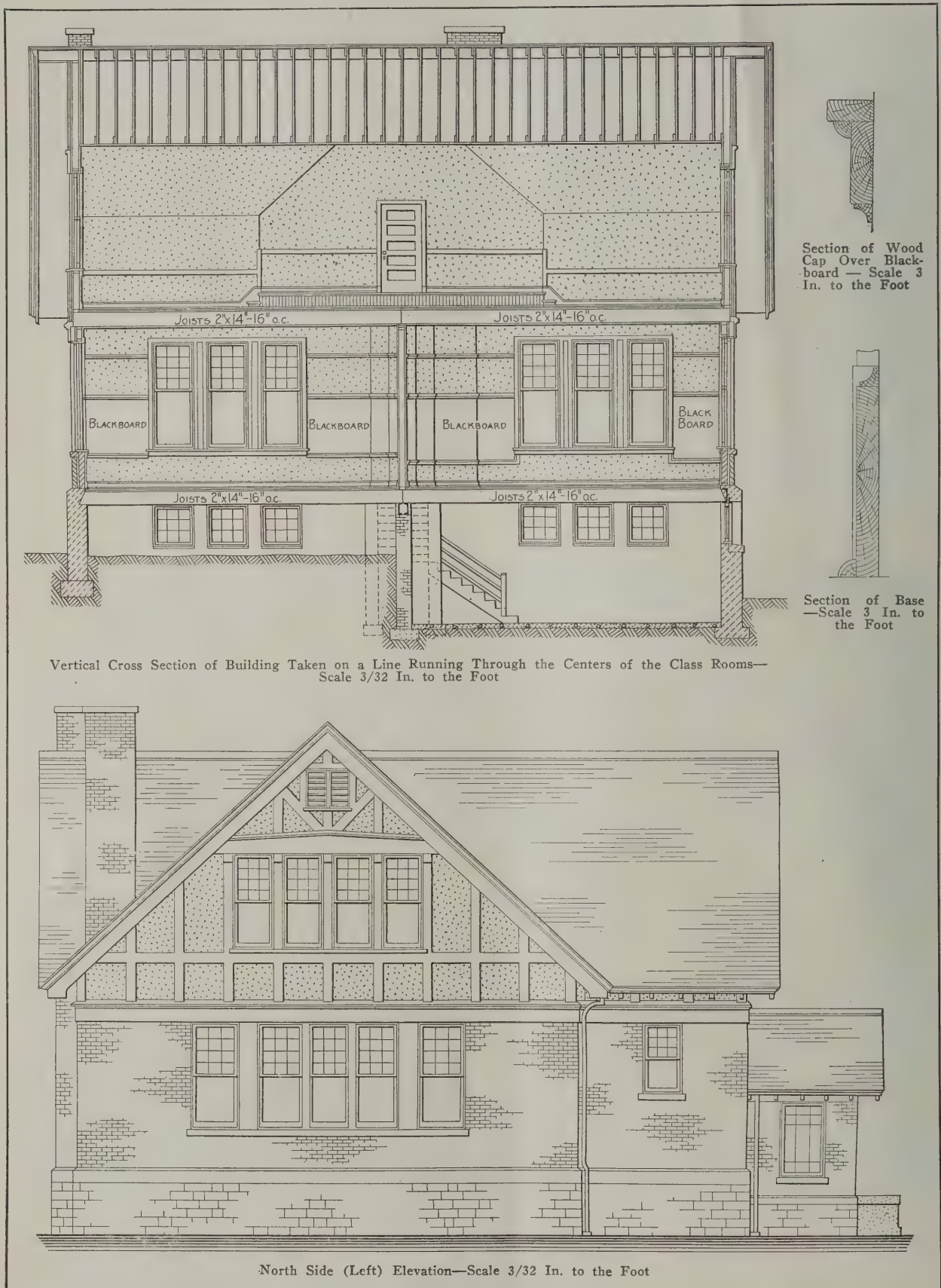
steel bronze butts and provided with a tumbler lock with knob and escutcheon, Bower-Barff finish. The knobs and escutcheons are of bronze metal.

The door to the teachers' wardrobe is hung with two 3½ x 3½-in. steel butts, while the bookcase doors are hung with two 2½ x 2½-in. steel butts.

The platform in the auditorium is raised two steps

from the level of the main floor, the joists of which are 2 x 6 in. placed 16 in. on centers, the floor of the platform being finished in keeping with the rest of the room.

The entire building is heated with a No. 64 Square Pot "Crusade" portable furnace, made by the Boynton Furnace Company, 106 West 37th Street, New York City. The basement plan shows the position of the



A Modern Two-Room School House at Wayne, Ill.

The doors and windows are glazed with double-thick sheet glass. The doors entering the class rooms from front and rear, as well as the doors to the cloak rooms, have a glass panel at the top.

heater, also the lines of pipe running to the various stacks. The return air duct is of galvanized iron, and runs on the ceiling of the basement from the furnace, then down to the floor and is connected with the bot-

tom of the heater, thus completing the circuit.

The hot air and return air registers are provided with suitable boxes to receive the hot-air pipe, and in the bottom of the cases there is an opening covered



View in Auditorium Looking Toward the Platform

tected on the back side with a galvanized wire screen.

The flagpole which surmounts the building extends 16 ft. above the roof, and is made of 8 x 8-in. Georgia pine and finished with a copper ball on top. The pole extends through the roof and is securely anchored.

The school building here illustrated and described is located at Wayne, Ill., and was erected in accordance with plans and specifications made by Postle & Fischer, 1732 Marquette Building, Chicago, Ill.

Some of the principal items of cost are carpentry work, \$3,495; masonry work, \$1,812; lath and plastering, \$786.12; painting, \$318; furnace, ducts, etc., \$429; blackboards, \$44.48.

The contract for the carpentry work was executed by S. A. Smith; the plastering by M. J. Lydon; the masonry by the Illinois Hydraulic Stone Construction Company, and the painting by E. J. Boldt & Son, all of Elgin, Ill.

Names of Timbers in Old English Buildings

In discussing old English building construction a writer in a London paper gives the various dialect names by which the partially curved or bowed members extending as a sort of brace from the sill to the ridge of a building are called. He says that in Northamptonshire they are known as "forks" and "crucks" and many are still remaining in ancient farm-



A Modern Two-Room School House at Wayne, Ill.—View in Class Room at Left of Partition Looking Toward the Rear Corner

with a slide door through which the dirt can be removed. The floor registers are of black Japanned ornamental fan type. The cold-air ducts are provided with a wire screen in the wall made of No. 9 wire 1½-in. diamond mesh with a rod frame.

There is a scuttle 30 in. square in the ceiling of the second floor to give access to the attic space above. This is provided with a frame and cover made of 4 x 4½-in. Georgia pine.

The louvres in the gables are of wood and pro-

houses and barns. In Westmorland and in South and West Yorkshire they are known as "crucks," and a building of this construction is said in South Yorkshire to be "built on crucks."

In Lancashire and Cheshire they are known as "crooks," and some of the largest examples are to be seen in those counties.

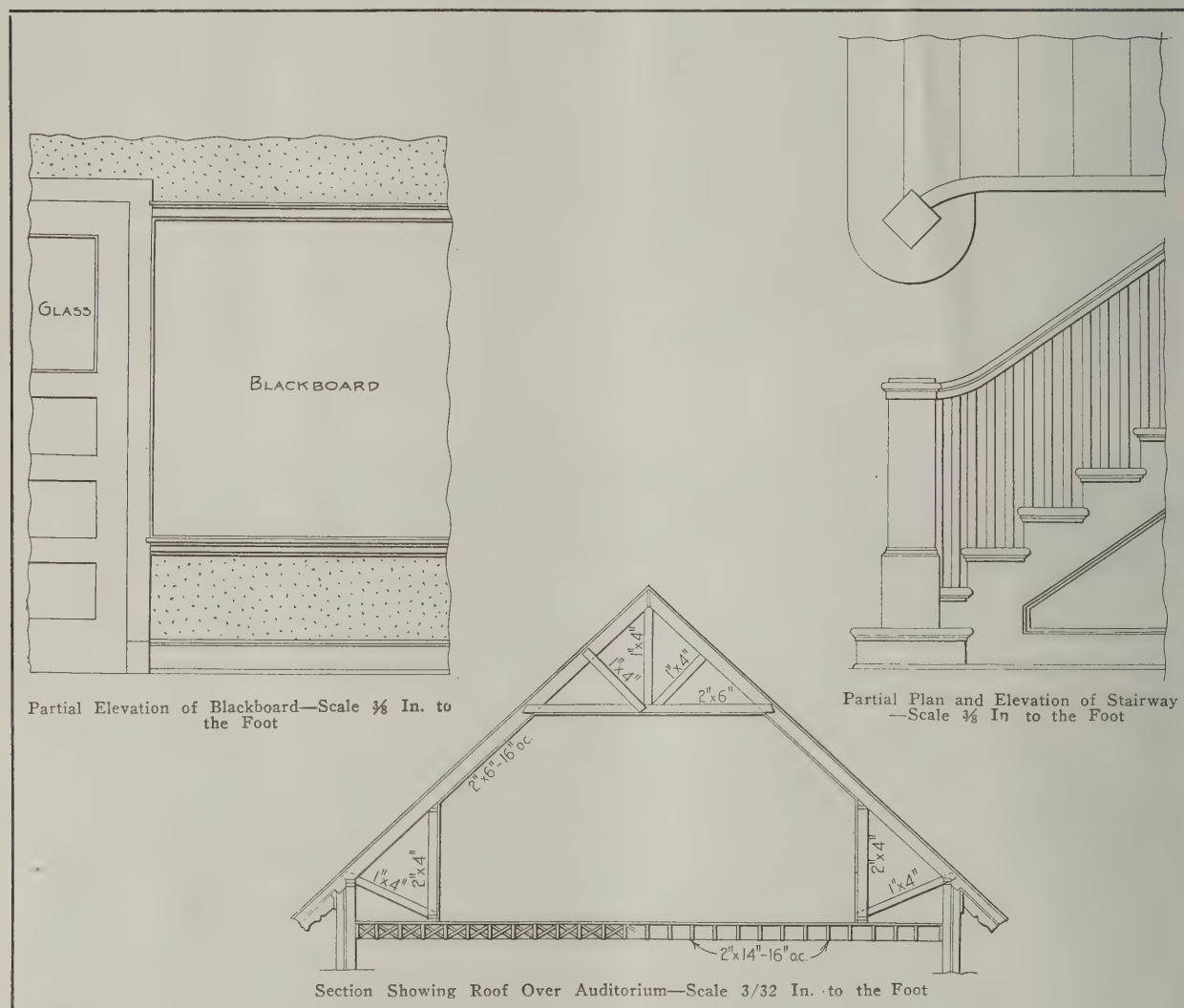
Plans are filed for a 12-story loft building to be erected in West 35th street, New York, to cost \$200,000.

A French Villa with Electric Conveniences

A house recently erected at Troyes, France, and known as *La Villa Ferie Electra*, makes use of the electric current for every possible purpose in enhancing the convenience and comfort of the occupants. Much of the work ordinarily done by servants is here performed by electric devices. A visitor to the villa finds that when he rings the gate opens by itself, while a voice proceeding from a hidden telephone, tells him to enter and allow the gate to close. There is also a

pears again through the floor, says a writer in the *Electric Review*. In a few minutes a receptacle for dirty dishes appears and awaits its load. In a similar manner all the food from the first to the last course is served. In hot weather there is a fan to blow cool air across the room, the air being both scented and cooled by passing over perfumed water. Of course, the room is electrically lighted.

In the kitchen not only is all the cooking done by electricity, but all the various utensils used in preparing the food are electrically driven. The dishes are



A Modern Two-Room School House at Wayne, Ill.—Miscellaneous Constructive Details

telephone at the front gate which permits the occupant to converse with the visitor. At the door the visitor is confronted by a mat which cleans and polishes his shoes. If the visitor arrives after nightfall the same push button that rings the bell will light up the path from the gate to the house.

The house is a real museum of electrical inventions and conveniences, the dining table being perhaps the greatest wonder. No servants wait upon the diners. Beside each plate is a small glass and metal cylinder which becomes an electric radiator at the touch of a button. Foot warmers are located under the table opposite each chair. At the head of the table is a circular desk, its center traversed by a metal strip with a groove like a miniature railway. At the touch of a button this desk disappears through the floor, and in its place a steaming tureen of soup arises ready for serving. The tureen passes automatically around the groove in the table from guest to guest until each one has served himself. Completing the journey it disap-

of aluminum. Among the machines to be seen here are a mincing machine, coffee grinder, dish washer and a buffer and polisher. The motor-driven apparatus for conveying the dishes to the dining room is located here.

In the laundry the washing, drying and ironing are done by electricity. All rooms in the house are heated, lighted and ventilated by the use of electric current. Telephones and electric cigar lighters are to be found everywhere. By a series of mirrors the occupant of the house can see who is standing at the gate in the street. By means of the telephone he can converse with the visitor and by pressing a button the gates are electrically made to swing open or close.

In the bedroom it is only necessary to press a button in order to have a hot-water bottle heated. In the morning the window shade can be raised or shutters opened in the same simple way, and breakfast, the morning newspaper and mail are automatically delivered to the room. An electric burglar alarm is operated should anyone attempt to break into the house.

A ROOFING JOB INVOLVING ORIGINAL FEATURES

Putting a Wooden Roof on a 65,000-Gallon Water Tank—A Piece of Work Which Was Not Done in the Ordinary Way

BY HEE H. SEE

IN spite of all the help one may get from other workmen or from his own experience, from textbooks or from technical journals, there are always phases of work cropping up which must be dealt with individually and in connection with which the only help he can expect from previous experience is the confidence it gives him in his own ability. The job about to be described may serve as an illustration. There is nothing particularly difficult about it either in the framing or erecting—nothing that even a very ordinary carpenter could not do. The point to be emphasized, however, is that we did not do it in the ordinary way and it is set forth

here by reason of some comments overheard by the writer at the time we were working on it. It is not

plan and elevation of a 65,000-gal. water tank which, with the steel tower, was already erected, our work being to put on the wooden roof. The left side of the drawing shows the inside of the tank, and at the right is represented the outside appearance of it. While we may admit that the drawing shows all that is required, I think most of my brother chips will agree with me when I say the draftsman might have used a little more

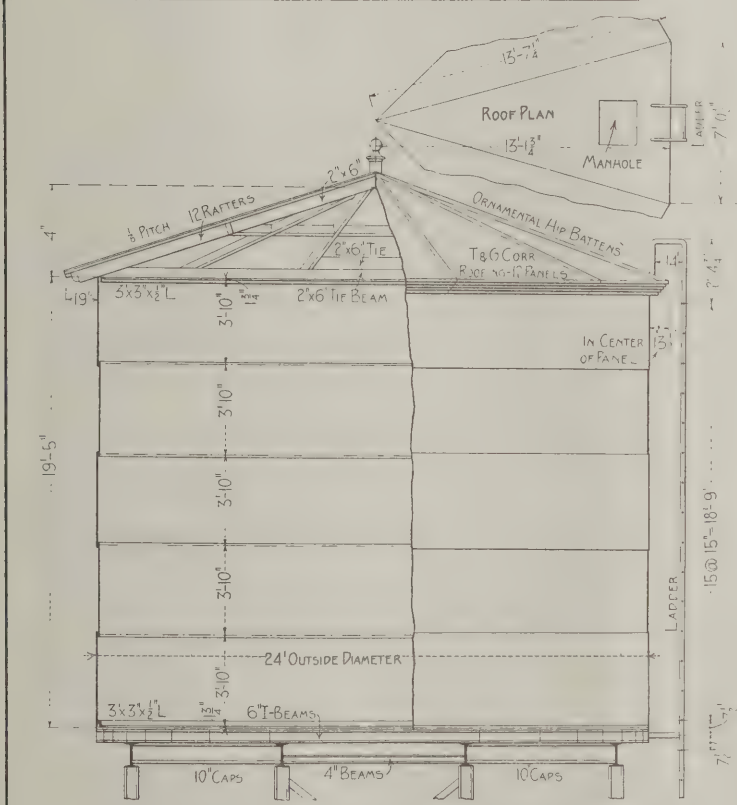
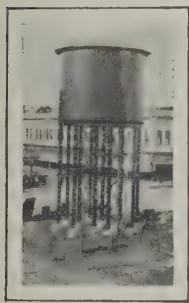


Fig. 1—Partial Plan of Roof, Also Elevation Showing Inside and Outside of Tank



Fig. 2—New Arrangement of Tie Beams

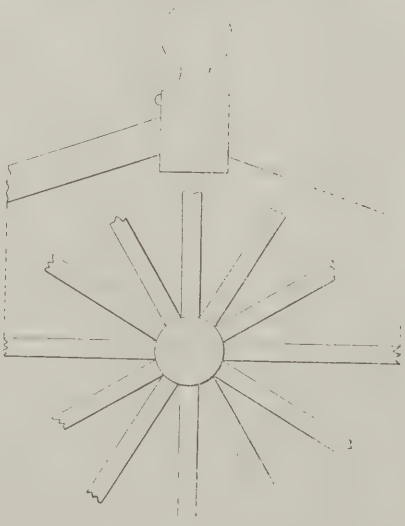


Fig. 3—Plan and Elevation Showing How the Finial was Set

A Roofing Job Involving Original Features

probable that many of the readers will ever have such a piece of work to construct, still there are one or two little "kinks" in it that might perhaps be made to help out on an entirely different job. The claw on a nail hammer is made for pulling nails, but it can be put to other uses; Old Bill Jones says it's the finest thing in the world to scratch your back with.

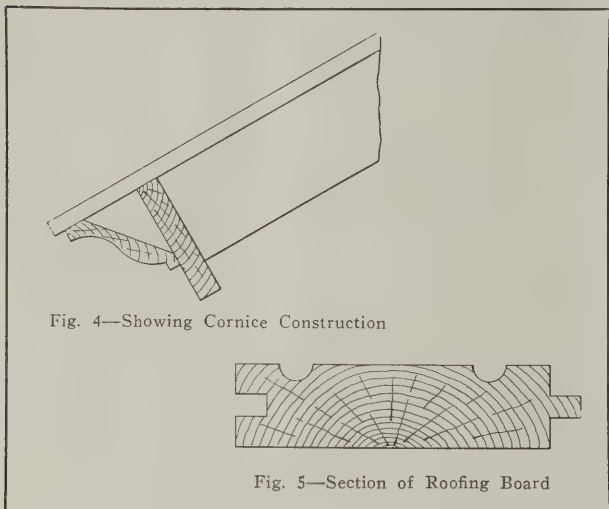
In Fig. 1 of the sketches is a copy of the plan from which we had to work. It is supposed to show roof

paper and made his ideas clearer to the man on the job. One particularly foggy point is the arrangement of the 2 x 6-in. tie beams. Of these there are supposed to be two, crossing each other at right angles, one above the other. No seat cut is shown on the rafters where they rest on the angle iron at the top of the tank, and while this may be all right, yet it is different from general practice, and in order to facilitate the work of setting the rafters we framed them with a seat cut.

The tank is 24 ft. outside diameter and 20 ft. high. The tower supporting it is 40 ft. high, and so brings the top of the tank 60 ft. above the ground. This latter item is only of importance when most of your men are of the kind who do not care how high they go so long as they can keep one foot on the ground.

We have in the past erected many wooden tanks, and when doing so we always built a scaffold on the inside from which to set up the staves and we work from the same scaffold when putting on the roof. The steel gang, however, works from a small scaffold that runs on rollers around the top edge of each row of plates as they are put in place, so that when we arrived on the present job there was nothing but the bare tank with the iron ladder running straight up the outside.

To have built a scaffold on the inside of the tank for this work would have been a bigger job than building the roof, when you take into consideration the fact that it would have to be torn down again. So we made



A Roofing Job Involving Original Features

some changes in the drawing and made the tie beams of the roof answer for our scaffold.

The new arrangement of the tie beams is shown in Fig. 2, where "A" is a full-length piece with a piece of 2-in. plank about 12 in. square spiked to its under edge. The other tie beams are cut to fit against "A" and rest on the piece of plank, the whole arrangement being well spiked together with another short piece of plank on top corresponding with the one underneath. A temporary post of 4 x 4-in. pine was placed under the piece of plank to support the weight of men and material until the rafters were in place when each tie beam was supported from its rafter by a 1 x 6-in. hanger at the center of the roof and the post was taken out.

The drawing, Fig. 1, shows the rafters all coming together at the peak of the roof with a turned finial resting on top of them. This is a mighty poor arrangement, as it doubles the work of cutting the rafters and makes them harder to set up and nail together. Besides this, after the tank is finished the painter, or any other man having work to do on the roof, usually attaches a safety line to this finial and there is plenty of chance for the nails to rust off in the years to come and thus cause an accident. In doing the work we set the finial in between the rafters as shown in Fig. 3, which enabled us to frame all the rafters of one length and with the ordinary plumb cut at the top. It will be noted that there are 12 rafters, as indicated by the words "12 panels" in Fig. 1, so that only every other rafter is made fast to a tie beam, the loose ones being held in place by the fascia and the 2 x 6 nailer (or purlin) cut in between the rafters at the center of their length.

All the framing was, of course, done on the ground and the various members were put in place in the fol-

lowing manner: For a hoisting rig we tied a 2 x 6 to the top of the iron ladder, letting one end drop inside the tank while the other projected about 4 ft. above. To this upper end we attached a single sheave block. The long tie beam "A" was cut to the right length and the short piece of plank spiked to its under edge. It was hoisted to the top of the gin pole and two men perched on the rim of the tank caught it and lowered one end inside. A ladder was placed against the far wall of the tank from the inside and the tie beam was carried up and set in place. The temporary post was then placed under it and two of the short tie beams were laid flat, one on each side of the tie beam "A," their ends resting on the piece of plank and on the rim of the tank. A man then crawled out to the center ready to nail the other tie beams as they were passed out to him. The angle and direction of these tie beams were marked on the piece of plank while on the ground, making it easy to give an approximately correct spacing.

In this connection it may be well to mention a simple little rule of geometry which is not as well known to the average mechanic as it ought to be, and that is this:

"The radius of a circle of any size when stepped around the circumference will always divide the circumference into six equal parts."

Knowing that our tank was 24 ft. in diameter we took a 12-ft. rod and with it spaced the six tie beams equally around the edge of the tank, tacking stay laths on them to hold them in place. This we did after we had placed our scaffold planks on them. We divided the circumference of the finial into six equal parts by the same rule and set up the six rafters corresponding with the six tie beams, after which we spaced the other six rafters between them.

The top of the tank was not quite circular, being 2 in. wider one way than it was the other, so in order to avoid framing each rafter for its own particular place we framed them all to the largest diameter and set up the first two pairs at right angles to each other, adjusting them so that the rafters of each pair showed the same margin at the seat cut before we spiked them to the tie beams to bring the peak of roof to the center.

The cornice consisted of a 1½ x 8-in. fascia with a 5-in. crown mold, as clearly shown in Fig. 4. This we put on from the top before we laid the roof boards, leaving the upper edge of the crown mold to be nailed to the roof boards as we applied them. A section of the roof boarding is shown in Fig. 5. There is a long cut to make in this material where it joins on the rafter and we saved both time and lumber by working two panels of the roof at once, the tongues of the boards in each panel pointing in the opposite direction. Then the waste piece from panel No. 1 worked in without recutting on panel No. 2 and *vice versa*.

After the roof boards were all on and their lower ends cut to line a special shape of batten was nailed over the joints at the hips. The completed job is shown at the very commencement of this article.

As stated at the outset there is nothing very difficult in this little job and yet it is one that might easily prove expensive under incompetent supervision. It may also be of interest as showing one of the byways into which the carpenter's business often goes.

An asbestos cement roofing tile known as "Eternit" has been brought out in Germany, the tile being produced by a thorough mixture of asbestos and cement and which, after high pressure has been applied, are solid and elastic as well as frost and fireproof. The tiles are smooth, light in weight and come in light gray, dark gray and red colors. A somewhat similar material is called "Eternit Wood," which is designed to imitate wood finishes and is used for wainscoting and similar purposes.

BUYING BUILDING MATERIALS ECONOMICALLY

Careful Estimating Necessary—What Constitutes a Safe Margin to Allow for Waste—Construction Costs as Shown by Individual Items

IT is probable that there are comparatively few builders who know how to buy building materials economically. Contractors handling large operations are able to employ expert estimators whose business it is to keep down waste, but the home builder is in large measure ignorant of material values, and so it often is with the speculative builder. When architects make the estimates, says a writer in a recent issue of the *Record and Guide*, the inexperienced builder is almost sure to fare better than if he took the figures himself, but the average speculative builder prefers to do the buying.

Estimating Cost per Cubic Foot

In estimating the cost of buildings for which plans have not been prepared, it is customary to figure in cents per cubic foot. In city property the cost will run from six cents for a frame dwelling with shingle roof, pine floors and finish, without bathroom or furnace, but otherwise a good house, to 20 cents for a brick dwelling fitted with good plumbing, bath, furnace, hardwood finish and well painted inside and out. A speculative building, in this city with ten-foot ceilings would cost from 15 to 18 cents a cubic foot, or \$1.50 to \$1.80 a square foot. Tenements and cottages to rent usually are figured at from 13 to 16 cents a cubic foot or from \$1.30 to \$1.65 a square foot. The typical New York flat is generally figured at from 31 to 40 cents a cubic foot, hotels range from 35 to 45 cents a cubic foot for first-class structures, from 28 to 40 for second-class structures and from 24 to 30 for third-class buildings. Churches run from 20 to 35 cents for plain ones, and from 30 to 45 cents for ornamental ones.

Construction costs differ. In New York they will be higher than in other cities. Wages for labor are higher here than in any other city in the country. It costs more to haul material, and the demand is steady enough to warrant high prices for materials whether made here or out of town. The average cost of a building in Chicago will run about 13 cents a cubic foot and a similar building in Boston will cost about 15 cents, while a counterpart of either one of these structures will cost over 20 cents to erect in New York. The above figures are for a fireproof building of about 500,000 cubic feet in volume and with floor areas of approximately 40,000 square feet.

In 1910, \$208,000,000 was expended in building construction in this city, more than half of which was for Manhattan operations. This was twelve and a half times more than was erected in Chicago, and more than three and one-half times that for Philadelphia, and no other city in the world reported more than one-quarter of that amount.

Extent of Demand for Building Materials

The extent of the demand for building material is more readily appreciated by such figures as the foregoing, and they supply a basis for conjecture on the losses sustained by builders who either cannot or do not figure close to requirements. The number of dollars involved in failures of builders in this city in 1910 gives a clue to the actual losses sustained by building material interests largely through the inability of builders to figure close to actual needs. The total runs to approximately \$19,000,000.

Where the Wastes Occur

The greatest waste is in the purchase of common

brick and lumber, although large sums are lost through careless handling or storage of perishable materials, such as Portland cement, lime and plaster. Carelessness is governed by management, hence it is not an item to be considered under the head of purchase of building materials. Losses arising from careless figuring are inexcusable because it is possible to reduce the element of waste in any building operation to a minimum even without the aid of an expert estimator.

Take lumber, for instance: the first thing to do is to apply to the New York Lumber Trade Association for a copy of its rules for lumber classification. If they cannot be procured there address the National Hardwood Lumber Dealers' Association, Chicago; the Mississippi Valley Lumber Manufacturers' Association of Minneapolis, Minn., or the Southern Lumber Manufacturers' Association, of St. Louis. These rules will give the various standards of lumber.

It is then necessary only to have the dimensions of your building, to make estimates. Gillette's rules are standard. In estimating the number of joists for each room (we are now speaking especially of speculative dwelling operations in the suburbs) count the actual number and add one joist; for an extra joist is needed for the wall. Joists are nearly always bridged and for this purpose 2 x 4 material is used.

Estimating Lumber

Allow 25 lin. ft. of 2 x 4 bridging for each "square" (100 square feet of flooring). Where 2 x 12-in. joists are placed 16 in. apart it will be found that the 2 x 4-in. bridging amounts to 9 per cent. of the number of feet, board measure, of joists. On a plain roof count the number of rafters and add one. In estimating the number of studs for walls and partitions allow one stud for every lineal foot of wall or partition where studs are spaced 16 in. center to center. This seemingly large allowance is made to cover the doubling of studs at corners, doors and windows. To estimate the quantity of shiplap or sheeting calculate the exact surface to be covered, deducting openings, then add 15 per cent. for sheeting and 17 for shiplap on floors, 17 for sheeting and 20 for shiplap on sidewalls and 20 for sheeting and 25 for shiplap on roofs.

Sheeting is laid with 2 in. space on cheap roofs. In such cases deduct accordingly. When sheeting and shiplap are laid diagonally add 5 per cent. to the foregoing figures to allow for waste in sawing both ends.

Lumber comes in even lengths, 16 feet generally being the maximum. It is, therefore, necessary to examine each area to be covered to see if the standard length will cover it or whether there will be waste on each length, and figure accordingly. In figuring the amount of siding required, calculate the exact surface, deducting openings, and add 33 per cent. if 6-in. siding laid four and a half to weather is used. If it is 4-in. siding, add 50 per cent. to the surface.

Figuring Flooring

Flooring comes in two classes—dressed or square edged flooring and dressed and matched flooring. The square edge flooring ordinarily has a face width of about $\frac{1}{2}$ in. less than its nominal width, thus a piece of 6-in. square edge flooring has a face width of $5\frac{1}{2}$ in. and a piece of 4-in. flooring has a face width of $3\frac{1}{2}$ in. The loss in the case of the flooring with $5\frac{1}{2}$ -in. face is 9 per cent. and in the case of the $3\frac{1}{2}$ -in. face the

loss is 14 per cent. But in addition to these mill losses there is usually waste owing to bad ends, etc., so that after estimating the exact area of floor, 11 per cent. should be added for 6-in. flooring and 20 per cent. for 4-in. flooring. Add 17 per cent. for 6-in. flooring where dressed and matched flooring is used, 25 per cent. for the same in 4-in. flooring, 33 per cent. in $2\frac{1}{4}$ -in. dressed and matched, and 40 per cent. in $1\frac{3}{4}$ -in. dressed and matched flooring. Extra allowance must be made if the floor is to be laid under partitions, and if the architect has so spaced the joists that full lengths cannot be used, there may be a very large waste not included in the above allowances. This, by the way, is one of many instances where the inexperienced builder, figuring close, finds himself overwhelmed with extras. Estimate flooring less than one inch thick as one inch. Ceiling and wainscoting are estimated exactly as dressed and matched flooring is estimated.

Buying Common Brick

In the purchase of common brick there is a great deal of waste. Bats, or half brick, result from careless dumping or loading on trucks, and the building department permits only a small percentage of these to go into a wall, generally depending upon the weight the wall has to sustain. There are three grades of common brick, commonly classified as Hudsons, Raritans and "Jerseys." Connecticut common brick also comes into this market at times.

Common brick is sold at wholesale at so much a thousand, depending upon the season of the year, supply and demand. The term "run-of-kiln" means that the brick so sold is taken from the kiln without being selected as to hardness, color or texture. "Culled" brick is that from which all so-called pale or light hards have been eliminated and they possess a "true metallic ring" when knocked together in the hand, thus showing thorough burning and soundness. The retail or "yard" price is that fixed by the dealer and which is quoted to the consumer. It is the wholesale price, plus carting from barge to his yard, and his profit, which varies according to the rating of the customer, the amount of credit he wishes, the distance the brick has to be hauled from yard to job, and the periods over which deliveries will extend. In winter there is added to this price the charges for covering the barges in the wholesale market and the fees the city exacts from brick men for watching them, whether the owner provides a watchman or not. This usually makes the winter price fifty or seventy-five cents more than the actual wholesale price. A thousand brick are figured at 40 cu. ft. when laid. There also are companies which deal in second-hand brick, but these seldom or never go into fair grade work except mill construction, and are not important as a marketable building material any more than are second-hand steel, trim and lumber.

Mortar Formulae

The mortar item is an important one for the builder to consider, and in this he must guard himself against waste. A barrel of Portland cement weighs 380 pounds and four cloth bags make one barrel. Each empty bag weighs one and one-half pounds. If cement is bought in bags a charge of ten cents each is made, but a refund of from eight to ten cents is allowed upon a return of the bags. Cement cannot now be bought in wooden barrels.

Lime mortar may be mixed one part lime to three of sand, this proportion consuming about nine-tenths of a barrel of lime per thousand of brick, kiln count, the brick being laid with three-quarter-inch joints. A common allowance in estimating the cost of mortar for standard size brick is one barrel of lime and six-tenths of a cubic yard of sand a thousand, kiln count.

About one-half a cubic yard of mortar is usually allowed per cubic yard of brick masonry, or seven-tenths

of a cubic yard of mortar for a thousand of brick when the brick are laid with half-inch joints. If cement mortar is used, the number of barrels of cement per cubic yard of mortar will seldom be less than 1.6 per thousand of brick, or eight-tenths barrel per cubic yard of brick masonry, for if the mortar is made leaner it will not trowel well and causes more loss in labor than is saved in cement.

Kelly Island, Rockland and other standard grades of lime are sold by the barrel 220 pounds net. When shipped in bulk $2\frac{1}{2}$ bushels of 80 pounds per bushel are usually called a barrel. A barrel holds about 3.6 cubic feet. The average yield of lime paste from the best limes is 2.6 barrels of paste for each barrel of quick lime. This paste is usually mixed with two parts sand by measure. It therefore takes about $1\frac{1}{2}$ barrels of the best quicklime to make a cubic yard of mortar.

A word may here be said about the purchase of lime in bulk. Good lime is protected against air slaking, and for that reason it is sealed and certified with the manufacturer's certificate within. This lime sells for a dollar a barrel. Many builders buy their lime in open carload lots, for about 60 cents a barrel, and think they are getting a bargain. As a matter of fact, such lime is air slaked and it will take two of these 60-cent barrels to do the work of one barrel of certified lime. Here is where many builders lose money. It is a leak that would be instantly stopped if the builder would only take the time to investigate. Most individual builders do not know this difference until they find their original estimate way out of proportion to what their actual building cost proves to be.

Estimating Lathing

Metal lath is now as generally used as wooden lath, and it is an important item of figuring construction. The standard size of wood lath is $\frac{1}{4} \times 1\frac{1}{2}$ in. $\times$ 4 ft. There is a special lath, however, which is made in 32-in. lengths. Lath are sold by the thousand in bundles of 50 or 100 lath in each. The price is usually around \$3 per 1000, and 1500 are required to cover 100 sq. yds. Allow ten pounds of 3d nails for 100 sq. yd. when joists are 16 in. on centers, and 1250 lath are usually counted a day's work for a lather.

The total cost of wood lathing should be somewhere around \$8.64 per 100 sq. yds. Metal lath runs in weight from 2.65 to 2.84 lbs. a square yard, and the cost varies from 15 cents to 20 cents a square yard. The total cost per 100 sq. yds. for metal lathing should not be much over \$18.50. These figures include the cost of scaffolding and are on a 6000 sq. yd. basis.

Plastering Estimates

Plastering is generally applied in three coats—scratch, brown and white or finish. On brick walls the scratch coat is often omitted. Plaster is made either with lime or gypsum, known also as plaster of Paris. Some plasters are made with lime gauged with Portland cement. Whatever kind of plaster is used, sand and hair are mixed with the plaster. The hair comes in paper bags which are supposed to contain one bushel of hair when beaten up, and supposed to weigh seven pounds. Some cement plasters are sold with the proper amount of hair mixed in. Cement plaster is commonly sold in 100-lb. sacks, four sacks to the barrel. The usual quotation is 25 cents a bag.

In making lime plaster one part of lime paste is used to 2 or $2\frac{1}{2}$ parts of screened sand. About $1\frac{3}{4}$ yards of sand are required per 100 yards of three-coat plaster and about four barrels of lime or cement plaster and two bushels of hair. The cost of 100 sq. yd. of three-coat plaster should come to \$21.20.

Excavating, front brick, stone, stucco and other exterior material vary in cost according to the character of the work, but none of these represent such serious leakages as do the items herein enumerated.

Chicago's New Advertising Building

A building of the skyscraper type, and which will be occupied exclusively by advertising concerns of the city, is rapidly approaching completion in Chicago, and will be the first and only structure of its size in the world devoted entirely to advertising interests. The building is sixteen stories in height, and has basement, and two sub-basements. The frontage does not exceed 45 ft., the depth 87 ft., and, structurally, the



Chicago's New Advertising Building as It Appeared in Process of Construction

building has a number of interesting features. A view of it in process of construction is shown herewith.

The general architectural style is a modified Francis the First, which is at considerable variance with the classic and Renaissance styles that have been so popular in the city of Chicago. The structure, unlike many of the city's principal buildings, is designed without the projecting cornice. However, the necessary enrichment of the top of the building has not been neglected, for it is graced with a slightly projecting balcony, which with the open colonnade work, are sufficient to give an interesting finish to the upper portion of the building.

The structure is carried on caissons, seventeen in number, with diameters ranging from 4½ to 5½ ft., which rest on bedrock 105 ft. below the street level. The entire frontage of the first floor is free from columns, the structure being carried on the columns at the two corners of the building. Spanning the frontage at the second floor level is a five-foot girder, which serves as a support for two additional columns extending to the top of the building. These columns are placed adjacent to the corners, at the junction of the

brick and terra-cotta sections of the exterior. The central portion of the front is therefore free from columns from top to bottom of the building. In the remainder of the structure columns with usual spacing are provided. The floor construction is such that no beams will project below the ceiling, this being accomplished by making the girders double and of the same depth as the floor beams.

The exterior of the building is of red brick and white terra-cotta, the combination giving a most pleasing effect. This terra-cotta apron is continuous from the sills of the fifth story to the top of the building, thereby giving the structure an appearance of increased height. In considering the wind bracing problem, a unique and probably new type of construction was adopted with regard to the gusset plates. Instead of being attached to the sides of the columns, the gusset plates pass through the columns, each gusset plate replacing the web at the area of intersection and forming virtually a part of the column.

The floors are of hollow tile construction, and the interior trim is of solid mahogany. The equipment of the building is modern in every particular, and the heating system is of the vacuum steam type. Three electric elevators will run therein, two being passenger and one a combination freight and passenger elevator. The walls and ceilings are of plaster in the offices and of ornamental plaster in the corridors. Work is being hurried along so as to have the building ready for occupancy about May 1, 1913. The architect is W. Carlys Zimmerman of Chicago.

The owner of the building is Frederick R. Barnheisel, for whom White & Tabor are the agents. The Wells Bros. Company are the general contractors, and the following list gives the names of some of the sub-contractors and supply firms:

- Cement.—Universal Portland Cement Co.
- Frames and Sashes.—Chicago Sash, Door & Blind Manufacturing Co.
- Maple Flooring.—Herman H. Hettler Lumber Co.
- Coated Paper.—F. W. Bird & Son.
- Elevators.—Otis Elevator Co.
- Fireproofing.—Illinois Terra-Cotta Lumber Co.
- Sash Chain.—Orr & Lockett Hardware Co.
- Hardware.—P. & F. Corbin Co.
- Wheels for Sash Chain.—Coleman Hardware Co.
- Heating.—William Lees.
- Stack Lining.—Keaseby & Mattison Co.
- Ornamental and Miscellaneous Iron.—F. P. Smith Wire & Iron Works.
- Plumbing.—E. Baggot Co.
- Sheet Metal.—McFarland-Hyde Co.
- Shoring.—H. Sheeler.
- Sidewalk Lights.—American 3-Way Prism Co.
- Structural Steel.—Noelke-Richards Iron Works.
- Terra-Cotta.—American Terra Cotta & Ceramic Co.

Architects Are Not Builders

A decision having an important bearing on the expenditure of school bond money through California has been received by State Superintendent of Public Instruction Hyatt from Attorney-General Webb, dealing with the matter of whether or not architects whose plans have been accepted for school buildings are obligated to provide bonds to construct the buildings themselves within their estimates in case the contractor's figures go above the estimates.

It is held by the Attorney-General that there is nothing in the present law which makes possible an affirmative answer to the question. The law, according to the Attorney-General's opinion, does not contemplate that architects shall be builders.

A FRAME BUNGALOW WITH EXTERIOR OF STUCCO

Plans, Elevations and Details which Are Based Upon This Month's Cover Design
—Finish of the Various Rooms—Some Interesting Figures of Cost

WE take pleasure in presenting upon the facing page the various elevations, floor plans and a few miscellaneous details relating to the design which ornaments the front cover of this issue of *The Building Age*. An inspection of the floor plans will show that there is ample room for a family of four, with maid, and an extra spare room for guests, while in the attic the store room can be fitted up as a sleeping room in the future if such a course would seem to be necessary or desirable. All the rooms are of sufficient size and are well lighted and ventilated.

There is a basement under the entire building with considerable room for heating plant, storage, etc. The footings under the entire building are of concrete 10 in. thick and 22 in. wide mixed in the proportions of 1:3:5. The basement walls are also of concrete 10 in. thick, the mixture being of the same proportions as for the footings. The basement has a concrete floor 6 in. thick and the walls are painted white.

All timbers are of first-class spruce. The exterior and interior walls are built of 2 x 4-in. studs placed 16 in. on centers. The exterior frame is covered with sheathing laid diagonally, over which shingle lath are nailed as furring strips, and to this the metal lath is fastened. To the metal lath two coats of stucco are applied, the stucco having a light green tint with a rough pebble dash finish.

The roof is covered with No. 1 Perfection red cedar shingles laid 5½ in. to the weather, and those of the porch roof are laid 4 in. to the weather. The shingles are stained a dark brown.

The joists for the first floor are 3 x 10 in. placed 16 in. on centers; the attic floor joists 2 x 8 in., also placed 16 in. on centers, and the rafters are 2 x 8 in., placed 20 in. on centers.

The first floor is double, finished in maple, while the second floor is finished in pine.

The living and dining rooms are paneled and have a false beamed ceiling. The finish of these rooms may be birch or cypress and stained a rich brown. In the kitchen, pantry, the bedrooms and the remaining portions of the house cypress is used, and the doors may be of cypress or white pine. In the bedrooms the trim is enameled white and the doors are stained mahogany.

The outside trim of the house is of first-class pine stock and painted a dark brown. All window sash throughout the house are of pine painted white. The plaster in the hall, living room and dining room consists of two-coat work tinted with a sand finish. All other rooms have two coats of plaster and are tinted. Dull red tinted square tile are used on the porch floors. The bath room floor is covered with mosaic tile and the side walls are tiled for a height of 3 ft. from the floor with 3 x 6-in. white tile.

The hearth and chimney breast, also the living room, are covered with Terrazzo tiles.

Bookcases are built in between the living and dining rooms with panel back toward the dining room. In the dining room bay window is a seat with closet underneath. The dining room also has a built-in side-board.

The chimneys are built up of good hard burnt brick lined with 8 x 8-in. tile flues.

The plumbing is of standard make and with porcelain enameled fixtures in the bath room. All exposed

pipes have nickel-plated finish. The bungalow is heated by steam, all material being of the best and the system guaranteed to provide 70 degrees Fahrenheit in zero weather.

The building is lighted by gas and electricity. All hardware is a dull bronze finish.

The following estimate of cost of material and labor will be found interesting, the figures including the contractor's profit:

Excavating	\$ 100
Concrete footings and foundation walls.....	285
Grading	30
Wood floor beams, partitions and rough carpentry...	1,400
Chimneys and fireplace.....	150
Windows and door frames.....	300
Shingle roof	130
Inside and outside plastering.....	470
Interior doors, trim, stairs, etc.....	280
Finished wood floors.....	210
Painting, staining and tinting.....	275
Sheet metal work.....	45
Hardware	75
Plumbing and gas fitting.....	300
Heating	370
Electric wiring	50
Combination lighting fixtures.....	40
	\$4,510

The house is figured on the basis of 15 cents per square foot for this type of dwelling and includes plumbing, lighting, hardware and fixtures. According to the architect, Arthur Weindorf, Long Island City, N. Y., it can be built for \$4,500, and in some parts of the country for not more than \$3,400.

Birmingham's New Hotel

The contract for the construction of what will be known as the Tutwiler Hotel in Birmingham, Ala., has recently been awarded to Well Bros & Co. of New York City, the building having been designed by William Leslie Welton of Birmingham, Ala., and W. L. Stoddart of New York City, associate architects.

The building will be 12 stories above street level and one full story under ground. The height from the sidewalk to the coping will be 157 ft. Above the sidewalk level the building will be 140 x 150 ft., with a light court 91 ft. by 98 ft. above the second floor level.

The steel superstructure will be supported on concrete foundations carried down to bedrock. All floors will be of hollow tile arches with concrete covering, while the finish floors, where practicable, will be tile, marble or cement.

The plans provide for 343 rooms, with provision for a future extension to the hotel of 104 additional rooms. Space is provided on the roof for an open-air garden, floored with red promenade tile and arranged for lattice pergolas edged with flower boxes, etc.

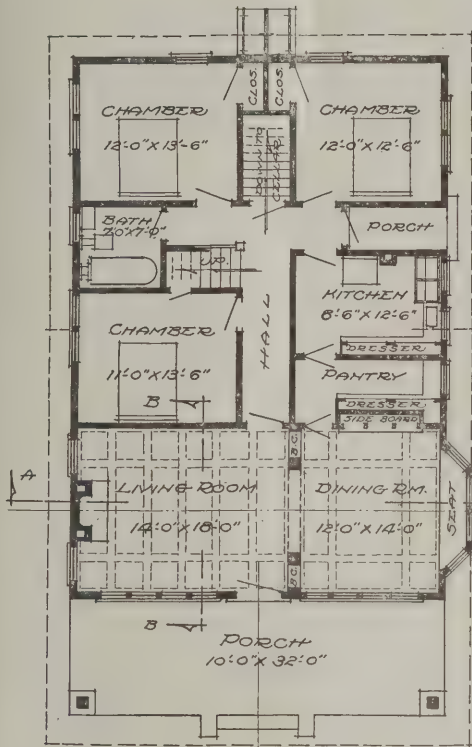
The new hotel will represent an investment of \$1,150,000, and will be located on the corner of Fifth Avenue and 20th Street, Birmingham, Ala. It will embody every modern feature of high-class hotel construction and will present a very ornamental appearance when viewed either from the front or rear.

Contractors and builders in San Jose, Cal., are looking forward to a big building year, as the outlook was never before so bright as at present.

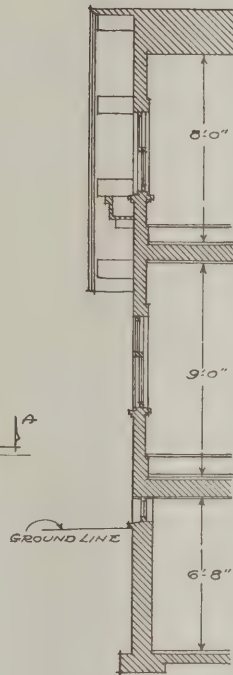


FRONT ELEVATION.

SIDE ELEVATION.

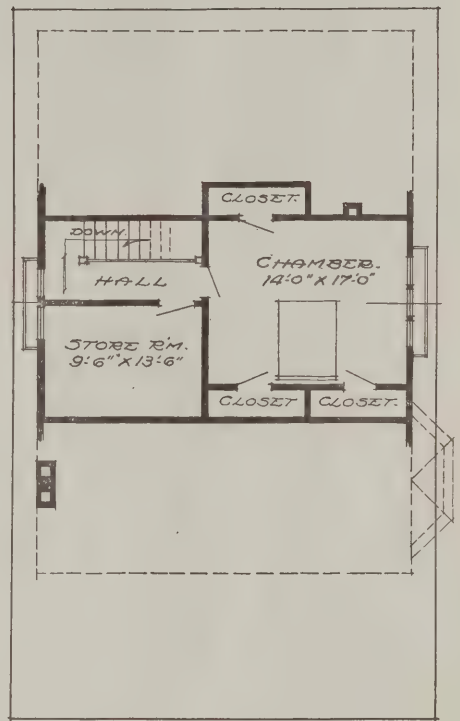


FIRST FLOOR PLAN



SECTION

PLAN & ELEVATION SCALE: 1" = 8'-0"
SECTION & DETAIL SCALE: 1" = 4'-0"



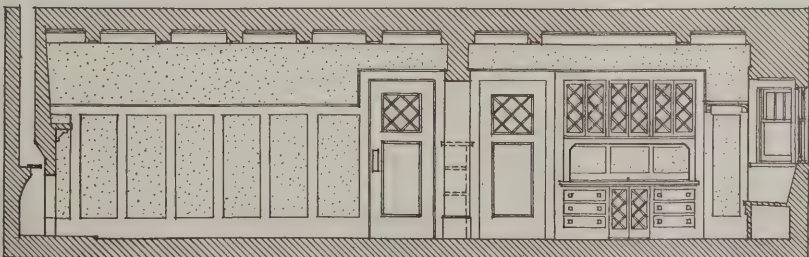
ATTIC FLOOR PLAN



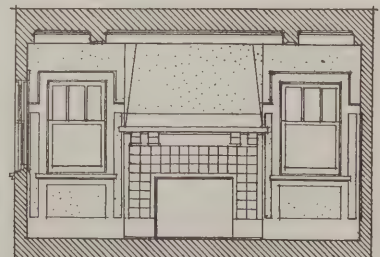
SIDE ELEVATION.



REAR ELEVATION



SECTION - A A



SECTION - B B.

CHICAGO'S SIXTH ANNUAL CEMENT SHOW

An Educational Display of Great Benefit to All Interested in
Building Construction—Demonstrations Showing
What May Be Accomplished

THAT the popularity of the Cement Shows in Chicago are increasing year by year was well demonstrated by the attendance at the sixth annual exhibition, which opened in the Coliseum on January 16 and which will continue until the 23d. The attractive arrangement of the displays showing the uses of cement and the superiority of buildings of concrete construction together with the varied assortment of cement machinery made the exhibition this year more than usually interesting to the public, especially from an educational standpoint. No trouble or expense had been spared to make the affair fully up to the standard, and the results were shown in the more than 20,000 visitors who attended on the opening night. The Illinois State Band rendered musical selections during the evening which added much to the enjoyment of those who were present.

Prominent among the exhibits of more or less interest to readers of *The Building Age* were those of the following concerns:

American Saw Mill Machy. Co., Hackettstown, N. J.
Art Marble Supply & Equipment Co., Newark, N. J.
Arrowsmith Concrete Tool Co., Arrowsmith, Ill.
Anchor Concrete Stone Co., Rock Rapids, Ia.
American Steel & Wire Co., 72 West Adams street, Chicago.
Art Stone Co., Waynesboro, Pa.
Badger Concrete Mixer & Machy. Co., Madison, Wis.
Barrett Mfg. Co., Otis Bldg., Chicago.
Blystone Machy. Co., Cambridge Springs, Pa.
Cement Stave Silo Co., Elgin, Ill.
Century Cement Machine Co., 218 Mill street, Rochester, N. Y.
Ceresit Waterproofing Co., 72 West Adams street, Chicago.
Chicago Portland Cement Co., 30 North La Salle street, Chicago.
Chicago Builders Specialties Co., Old Colony Bldg., Chicago.
D. & A. Post Mold Co., Three Rivers, Mich.
Eberling Cement Mch. Co., The, Cleveland, Ohio.
Eureka Machine Co., Lansing, Mich.
Elite Mfg. Co., Ashland, Ohio.
Foote Concrete Machy. Co., 108 South La Salle street, Chicago.
Hobbs Concrete Machy. Co., Detroit, Mich.
Ideal Concrete Machy. Co., South Bend, Ind.
Knickerbocker Co., Jackson, Mich.
Kramer Automatic Tamping Co., Peoria, Ill.
The Kent Machine Co., Kent, Ohio.
Lansing Company, Lansing, Mich.
David Lupton's Sons Co., Philadelphia, Pa.
McCoy Silo Form Co., Berger Bldg., Pittsburgh, Pa.
Monolithic Silo & Constr. Co., Peoples Gas Bldg., Chicago.
Majestic Furnace & Foundry Co., Huntington, Ind.
Miles Mfg. Co., Inc., Jackson, Mich.
Multiplex Concrete Machy. Co., The.
The National Roofing Co., Towanda, N. Y.
Oshkosh Mfg. Co., Oshkosh, Wis.
Ohio Post Mold Co., Toledo, Ohio.
Peerless Brick Machine Co., Minneapolis, Minn.
Read & Morrill, Inc., 179 Joralemon street, Brooklyn, N. Y.
Reber & Lang Mfg. Co., Kendallville, Ind.
Sasgen Brothers, 2053 Racine avenue, Chicago.
Self Dumping Wheelbarrow Co., Springfield, Ill.
Snell Mfg. Co., South Bend, Ind.
Simpson Cement Mold Co., Columbus, Ohio.
Sterling Machy. Co., La Crosse, Wis.
Sandusky Portland Cement Co., Sandusky, Ohio.
Standard Scale & Supply Co., 1345 Wabash avenue, Chicago.
Twentieth Century Mfg. Co., Chicago Heights, Ill.
Universal Portland Cement Co., Chicago.
Van Guilder Hollow Wall Co., Chamber of Commerce, Rochester, N. Y.
Wheeling Mold & Foundry Co., Wheeling, W. Va.
Waterloo Cement Machy. Co., Waterloo, Ia.
Western Roofing & Supply Co., Fisher Bldg., Chicago.
C. S. Wert, Kendallville, Ind.

One of the extensive displays worthy of more than passing notice was that of the Department of Commerce and Labor of Washington, whose exhibits showed the results of their research investigations.

Matters of industrial importance dealing with cement and structural metals were the center of much interest. The exhibits relating to testing of the corrosion of structural metals and the effects of variation in the composition of the cement were to be seen, and explanation given by those in charge of the displays.

In the Annex was to be seen a fireproof cement residence, the erection of which is said to have taken only two days. The Universal Portland Cement Company,

which had an extensive showing, established a small theater in the Annex and illustrated lectures were given every hour on subjects dealing with the uses of concrete. A one-piece silo in course of construction created much interest, as did models of concrete-poured houses. Cement machines and stone crushers in full working order caused interested visitors to stop and investigate.

The manner in which the sixth annual Cement Show in the city of Chicago has been launched reflects great credit on the promoters, who are making every effort to show the possibilities for further developments in the concrete field.

The Low-Cost House Problem

Numberless efforts are now being made to solve the low-cost detached house problem and most of these efforts are through the use of concrete. It is a movement which if successful will mean a revolutionary advance in city housing, relieving the congestion of cities and affording equal opportunities for all in matters of indoor life, cooking, eating and sleeping. The tenement is a development to meet modern needs, but meets them none too well, says the *Universal Bulletin*. Low cost simple houses in the suburbs, with adequate transportation is a real solution and one that will combat the increase in crime and delinquency due to over-crowding, will raise the standards of citizenship and make the American family an increasingly strong unit.

If the development of concrete for residence construction shall bring this about, and efforts at Virginia Highlands, Washington, and scores of other centers seem to indicate this as a probability, a tremendous debt will be incurred by the nation to concrete and to those men whose efforts result in practical low-cost home building methods in concrete.

A New Apartment Hotel

The plans have just been filed for the construction of a 21-story apartment hotel and stores on West Fifty-ninth street between Fifth and Sixth avenues, New York City. The new structure will occupy the site of two buildings which were recently destroyed by fire.

The façade will be of brick and marble and will have a total height of 276 ft. It will be of fireproof construction and is estimated to cost \$600,000. According to the architect, C. W. Buckham, 307 Fifth avenue, New York City, the first floor, in which will be stores, will be wider than the upper stories, thus giving the structure somewhat the appearance of a monument. The ground floor will cover an area 75 x 100½ ft., while the upper part of the building will be 59 ft. wide and 92 ft. deep.

It is estimated that as many as 2,000 buildings were erected in St. Petersburg in 1911, and that probably one-half of these were apartment houses.

The year just closed was a record breaker as regards building operations in Wheeling, West Virginia, the construction work planned involving a total expenditure of \$1,041,343 as against \$959,543 the year before.

INTERESTING LITTLE CHATS WITH BIG BUILDERS

A Boston Builder of Medium-Priced Dwellings Who Is a Firm Believer in the Necessity of Organization and Who Thinks That To-day No Man Can Afford to Stand Alone

OF the work of the practical builder none is more important than the construction of thoroughly good moderate priced dwellings suitable for the rank and file of the population. The following account of a Boston builder who has had much experience in this line will undoubtedly prove of interest to many readers of *The Building Age*.

The past quarter century in Boston has seen a tremendous growth in the way of providing housing for the ever increasing population who live within a five-cent trolley ride of the business section of the city. The large estates of the Dorchester District, for example, which in former days consisted of roomy dwelling houses with plenty of land about them, have been divided up to provide sites for a host of more closely built, lower-priced habitations, until the population of the district is that of a good-sized city. Many builders have been active here in this development, and among those who have done good work is Francis G. Powell, who, to use his words, has "constructed about everything in the class of buildings used for dwellings, from the summer cottage disguised under the hypnotic name of 'bungalow' to the large apartment house."

Mr. Powell began his relationship to building from the side of the architect, but after eighteen years at the draughting table he wished to have a look at what he calls "the big outside." He found that it "looked good" and the building side of the housing problem appealed to him as being a "whole man's game." He liked it, and since then he has been very successfully engaged in planning, constructing, and disposing of dwelling houses, particularly of those of the medium-priced type.

His first "plunge" into the life of the practical builder was through carrying out some plans for a client as supplementary to his architectural work, and his formula for success in the matter of building and disposing of dwelling houses is simply finding out what the people want, giving it to them properly constructed, above all at a price which they are able to pay, and for the rest being "just plain honest."

Besides this, he adds that the builder must have cash, courage, a good brain, and a good body, and over all, that very necessary covering, a cuticle of sufficient thickness!

Mr. Powell has been able to observe, and has found very interesting the development in dwelling house

property in and about Boston following the growth of the city subsequent to its arriving at considerable size and commercial importance.

A method of construction much used at first was the brick house built in blocks, each with, perhaps, a frontage of 25 ft. Then the servant question, and the cry for light, air and sunshine became manifest, and an exodus to the suburbs began. "For the dweller in the city," he commented, "the apartment has come where, by pressing buttons, you get everything but space, and an automatic servant."

On the other hand, in the suburbs detached wooden homes for single families used to be built. Following

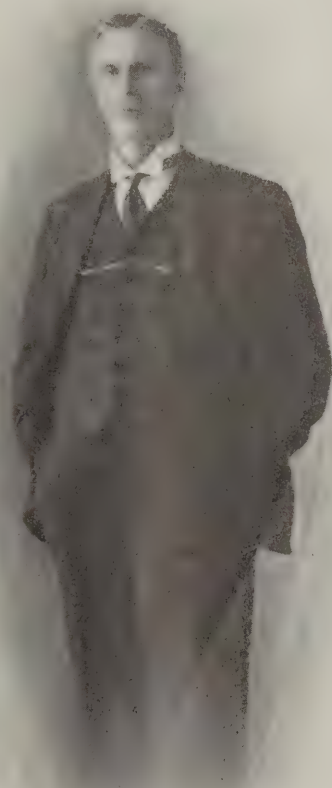
this the increased cost of living caused the evolution of the two-family, or "double house," where two dwellings of two or three stories each shared a common party wall. Still later the wooden "three decker" appeared, which gives an apartment for the owner with two others for rent, each on a separate floor.

"One thing has been proved," says Mr. Powell, "namely, that for the average citizen the one-family house in cities is becoming obsolete. Central care, a central heating plant, and lessened household work and expense appeal strongly to the average American of both sexes. It is also certain that badly planned, badly lighted houses, are less successful commercially."

"In the five-room apartment renting to-day for \$25 a month are found necessities that 30 years ago were luxuries existing only in the houses of the rich, including hardwood floors, open plumbing, steam heat, gas and electric lighting, gas and coal cooking apparatus and walls tastefully decorated to suit the tenant."

Mr. Powell is a firm believer in the necessity of organization, and thinks that to-day no man can afford to stand alone. He claims that the builder, as

a rule, buys his materials and labor in a "closed shop" and sells in an "open" one. The court of final appeal is the ultimate consumer; when the "squeeze" comes the builder is the man between. "Is it not conceivable," says Mr. Powell, "that the buyer should be able to dictate as well as the seller, and that the time might come when men directing affairs in the building business—the largest industry in the country except agriculture—would 'hang together' instead of being hanged separately. With a constantly increasing cost of labor and a decrease in efficiency; with a continuous merciless advance in the price of material, 'as much as the



One of Boston's Most Successful Home Builders

traffic will bear,' a point will be reached where a builder must become a wizard and pick things out of the air, or out of his creditors."

The question why buildings burn down in the United States at the rate of a thousand miles a year is, so to speak, a burning one in every state of the Union, and Massachusetts is earnestly at work seeking an answer. In accordance with a resolve of the Legislature of 1912, the Governor has appointed a commission of five members, consisting of the Fire Commissioner of Boston, an architect, a builder, an insurance man, and a real estate man to investigate loss of life and property, causes of fires, improvements in prevention and the fire hazard in the Metropolitan District, which includes Boston and thirty-seven surrounding cities and towns.

Mr. Powell, as architect, received appointment upon this commission. He is also a member of various building associations and civic societies, including the Massachusetts Real Estate Exchange and the Dorchester Board of Trade, and, as he puts it, "manages to keep the rust from accumulating on his personality."

The Burden of Workingmen's Compensation

Since the adoption of drastic liability acts dealing with workingmen's compensation, the rates charged by liability insurance companies for insuring employees have necessarily been heavily increased. In some cases they have been quadrupled as a result of the curtailment of the employers' defenses against suits and of the liberal guarantees made to the employee. Leaving aside all question of fraud and of "soldiering" on the part of the employees who are slightly injured or indisposed, there still remains a very heavy burden, and one which in many cases is likely to bridge the difference between profit and loss.

Under such circumstances any legitimate means for reducing the cost of such insurance will be hailed as a direct benefit. Such a means is at hand in the shape of mutual liability insurance written without the use of brokers, and thereby saving their commissions of 17½ to 30 per cent on the premiums. Norman F. Hessel-tine, manager of the Contractors' Mutual Liability Insurance Company of Boston, points out that a reduction of this sort, while perhaps of minor importance to a concern with heavy capital, is a vital matter to small concerns turning their capital over several times in the course of a year, such, for instance, as some contractors; and that the enforced payment in advance of the sums contemplated by recent legislation becomes, in the latter case, a very great hardship.

The Danger of Making Sounding Boards of Floors

Many times a sound deadening material is used without giving proper results. The reason for this can generally be traced to the principle of preventing the transmission of sound not being properly understood. In designing the placement of sound deadening felt, a firm of long experience in sound deadening problems should be secured, for if this is not done there is a liability of making sounding boards of floors instead of rendering them sound deadening.

Cincinnati's Chamber of Commerce Building

What will be, when completed, one of the tallest office buildings in the country outside of the city of New York is the new home of the Chamber of Commerce now under construction in Cincinnati, Ohio, and which is expected to be ready for occupancy about the

first of the coming May. It will be 34 stories in height and tower above Fourth Avenue for a distance of 495 ft. It will be surmounted by a pyramidal roof divided into panels of gold glazed terra-cotta, above which will be a lantern and observation gallery 440 ft. above the street level. The first four stories will be of white marble, with the exception of one course of granite, and the exterior above this will be of ivory white Mat glaze terra-cotta. The total height of the building from the foundations, which are four stories below the street level, to the lantern surmounting the room will be 549 ft. The building will contain 5,175,000 cubic feet of space and will be equipped with 12 elevators. Two self-contained stairways will extend from the top to bottom of the building. The total investment is placed at \$3,110,000. The type of building is an adaptation of the Italian Renaissance.

A special ventilation system will be established by which washed and purified air will be forced into the assembly hall of the Chamber of Commerce, and in the summer months the air will be water cooled, while in the winter it will pass through sprays of heated water.

Effect of Bad Ventilation on Health

It is a well known fact that sunlight, and dry, fresh air are very beneficial to health. It is equally well known that poorly ventilated and dark houses and rooms decrease the vitality of the occupants. It is well to call attention to the fact that the average humidity of the outside air is 60 per cent. to 70 per cent. of total saturation while due to poor ventilation and other factors the humidity of the average house, in the winter season, is 31 per cent. of total saturation.

The heat from various apparatus used to maintain a comfortable temperature in most instances completely dries out the air in the house unless additional moisture is provided at all times by good ventilation or other means such as by keeping water in the rooms. In just the same way as the air is dried out just so the normal moisture of the skin is reduced in amount or completely removed. The effect of the removal of moisture from the skin is the chilling of the skin. In this connection it may be stated that due to this factor persons in the winter season in the house will complain of a temperature of 65 to 70 deg. F. being too cool while in the summer such temperature is oppressive.

It is known that the effect on certain individuals of being in a crowded, badly ventilated room is quite markedly deleterious. Physiologists, according to the Ohio State Board of Health, have not given a satisfactory explanation of this condition of affairs. It has been demonstrated that these acute attacks are not due to lack of oxygen and that in all probability they are not due to any excess of carbon dioxide gas as first thought. It is well proven that there are no poisonous substances in the air which produce these effects.

The ill effects of bad ventilation, according to recent investigation, seem to be due to an action on the skin and by vaso-motor reflex or hormone on the pulmonary circulation and the lungs. It is probable that the essential factors are the temperature and the moisture of the air coming in contact with the skin. Comparatively recent investigations have shown the lungs to be the seat of definite vital activities which are important to health and not alone organs of a passive nature through which gases diffuse. It has been stated by competent investigators that the pulmonary activities are very markedly influenced by conditions which affect the skin. It has also been shown in recent investigations that the high temperature and relative humidity of the atmosphere in cotton factories have a marked effect on the efficiency of the workers. The importance, therefore, of efficient ventilation and proper warmth and moisture of the skin is apparent.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

Sound-Proofing Walls in a Remodeled House

From J. W. B., Woodstock, Canada.—I am about to remodel a frame house which is to be made into a double house, with another section added so as to render it a three-tenement house. Some of the present walls will be utilized as party walls as they now stand.

I would like to know what would be the best and cheapest filling to make the walls sound-proof without removing the plaster from either side. Also what is the best method to fill in, making the new parting walls sound-proof with minimum expense.

The walls are to be not more than 5½ in. in thickness.

Answer.—As the inquiry of our correspondent above was received just after the January issue of the paper

which is used as shown on the drawings; that is, laid on top of rough stuff and then furring strips about 2 in. wide and 1½ in. deep are laid upon it on 16-in. centers. Upon this the upper or finish floor is laid and nailed, care being taken that the nails are not long enough to pass through the felt or quilt.

Regarding the old walls intended to be made use of as party walls, I would say that in place of using a filler, as the correspondent suggests, I would strip this vertically over the plaster and directly over the stud-ding; then cover this with felt or sheathing quilt, and then strip this again in the same way. Plaster boards and pulp plaster can be applied on this. One side of the wall finished in this way will be sufficient.

Of course this method of treatment will increase the thickness of the wall, but on account of being party walls there should be no door openings to contend with when finished. An idea of this construction is indicated in Fig. 2 of the sketches.

Coming now to Fig. 3 a few words of explanation will clearly indicate the method of sound-proofing whatever new party walls may be required. An inspection of the sketch shows the studding to be "staggered," 2 x 4-in. studding being shown on the drawing, making a 6-in. wall without plaster boards or plaster. I expect 2 x 3-in. studding, using 2 x 3's for sole pieces and plates, would give strength enough to meet the correspondent's

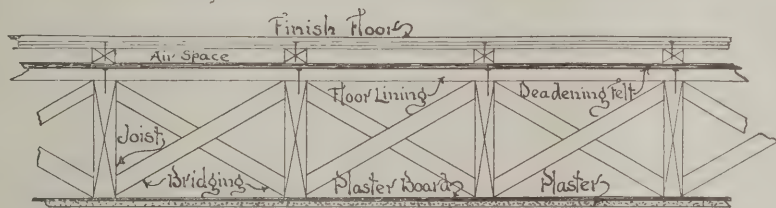


FIG. 1 CEILING & FLOOR SECTION

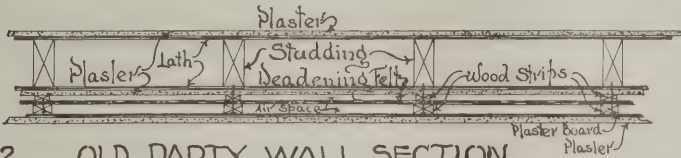


FIG. 2 OLD PARTY WALL SECTION



FIG. 3 NEW PARTY WALL SECTION

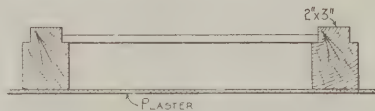


Fig. 4—Showing studs rabbeted at one edge.



Fig. 5—Showing studs rabbeted at both edges.

Sound-Proofing Walls in a Remodeled House—Methods Suggested by Various Correspondents

had gone to press, and in order that he might more promptly have the benefit of various opinions, we submitted the matter to practical builders in different sections, and give herewith the views which they expressed.

From Matt Riley, Sturgeon Bay, Wis.—The sectional drawings presented herewith and indicated by Figs. 1 to 3 inclusive may be of interest to the Canadian correspondent propounding the sound-deadening problem. Fig. 1 shows the method of deadening floors as usually carried out to meet requirements such as are described by the correspondent in question. As will be seen, deadening felt, or what is still better but more costly, sheathing quilt made of eel grass, either of

requirement, considering that twice the number of pieces are used ordinarily so as to have these 16-in. centers on either side of the wall.

It takes a lot of material to fill the wall and in my judgment one with air spaces is to be preferred.

From Civil Engineer.—There is one point regarding the sound-proof walls without removing the plaster which the correspondent could have rendered a little more clear. Can he get at the top of his partitions in order to fill them? If he can fill the walls from the top it will be a simple process. If he cannot fill from the top he must remove enough plaster and lath from the top—say, 2 ft.—so that he can drop in the material and tamp it reasonably well with weight and cord

as in pile driving, or else he may set up 3-in. studs on one side after removing the base. The studs should be rabbeted at one edge $\frac{3}{8} \times 1$ in. as shown in Fig. 4 of the accompanying sketches, and nail in rough $\frac{1}{2}$ -in. stuff and then fill and tamp as he gets up, provided he intends to plaster. The studs should be bored every 3 or 4 ft. and spiked to present walls.

For his new partitions he will have cheap and rapid sailing. He will need to rabbet both edges of the studs as shown in Fig. 5 of the details. Nail on the plate permanently, stay the studs carefully, nail in the $\frac{1}{2}$ -in. stuff previously sawed to length, raise the partition and nail in and fill the other side at pleasure. The $\frac{1}{2}$ -in. stuff may be thinner and of any cheap material according to circumstances. With plaster board or wall boards he need not rabbet at all, but sheath with any surfaced material, using $1\frac{1}{2} \times 1\frac{1}{2}$ -in. studs.

Cotton silicate is the best sound-proofing material thus far brought out. It is sometimes known as furnace slag and slag wool.

From Practical Builder.—I would say that under the conditions mentioned by the correspondent from Woodstock, Canada, he has something of a job on his hands. If I understand his requirements aright he wishes to use the lath and plaster partition walls of the old building as party walls of the new tenement without changing them in any way and without removing the plaster from either side.

It is supposed that he intends filling the wall with the deafening material from the top, and if there is no bridging in between the wall studs to prevent it, he may possibly be able to accomplish what he desires. Whether this will be any cheaper than taking off the plaster on one side of the wall depends entirely on local conditions, and the correspondent does not give sufficient data to enable an outsider to decide.

Where it can be obtained, coal cinders such as come from locomotive ash pits are about the best kind of cheap filling for sound-proofing purposes. The writer has never seen them used in partition walls, but has used them for sound-proofing floors with good success.

For the new partitions, the best way to prevent the passage of sound is to build them with two sets of studding—one between the other—so arranged that the sides of the wall have no connection with each other except the plate at the top and the sill at the bottom. For example, the correspondent limits the thickness of the wall to $5\frac{1}{2}$ in. This under ordinary conditions would call for a 4-in. stud, but for the sound-proof partition we would use 4-in. plates and sills and 3-in. studs, using twice as many as for a single partition, and setting every alternate stud flush on its own side, making what is really a double partition with the thickness of one.

Arranged in this way there will be a space of 1 in. between the back of the studs on one side of the wall and the lath on the other. Very little sound will pass through a wall of this kind, but to make a still better job make the partition 1 in. thicker and then place heavy felt paper or deafening felt between the two rows of studs, tacking to one set only.

This is probably the best method of making a partition sound-proof, but a chain is only as strong as its weakest link, and there is little use of going to this expense if the old partition walls are merely going to be filled from the top with cinders, mineral wool or something of that sort.

Bookkeeping for the Jobbing Shop

From J. H. M., New York City.—In connection with extensive real estate holdings it is necessary to employ four and sometimes five men. The system needed to thoroughly control these workingmen has not as yet been found, but I am sure that after describing in detail what is required some reader of *The Building Age*

will be able to supply the much needed remedy. The details are as follows:

The men employed are carpenter, plumber and helper, mason and plasterer and general worker. There is no foreman, because the shop is directly under the real estate office and the coming and going of the men are under an official eye. Material is bought at a nearby store that supplies everything. What I would like to know is how can the time, work, etc., of the men be systematized, also how can each and everything in the way of material used be accounted for and nothing bought that is unnecessary. The men at present have entire authority to obtain what is deemed by them as necessary. This as one may plainly see allows the men to over-buy and retain things for their own personal use.

The workingmen receive a slip O. K'd by the proper authority and after the men complete the work they in turn write out a slip, detailing thereon the material used, the time expended, the address of the job and the workman's name. These slips are turned in each day and the work done is charged to the special house, while the men's time is taken as well so as to make up the pay roll.

I would appreciate any suggestions that may be offered by those who have had practical experience in handling men and systematizing the records.

Answer.—Some very interesting comments touching the requirements of the correspondent above have been furnished by Arthur W. Joslin, a well-known contributor to these columns and a contractor who has had extended experience in all phases of the building business. He says: The correspondent raises some questions which are difficult to answer. In every line of business there is need of system, but in all of them a point is reached sooner or later where system runs itself out and dependence must be had on someone's integrity. Even before this point is reached the question of expense sometimes makes it advisable to stop the system and trust affairs to someone, even though you may feel that this "someone" may take slight advantage at times of the trust imposed in him. The building business is one to which the last remarks peculiarly apply.

The correspondent states that the men may "over-buy and retain things for their own personal use, also that there is no foreman; that the shop is directly under the real estate office and the men can be seen coming and going." To help out this particular case I should begin by making one of the men a foreman or superintendent, whichever you choose to call him, giving him a little more pay if necessary, and having him give enough more time to the business to be cared for to perform his own part of the work and take general charge and oversight of the other men employed. I should choose the carpenter for this place, because I think I can with safety assume that he would be the most intelligent, reliable and the best informed man among those enumerated by the correspondent above.

After a number of years' experience with all kinds of mechanics employed in the various building trades, I am confident I would more surely find the right man upon which to confer responsibility 19 out of 20 times by taking the carpenter, or in the case of several men being employed in each of several trades, one of the carpenters. The carpenter's training gives him a broader knowledge of all the building trades than is usually acquired by any other craftsman. He can generally "size up" a repair job requiring labor and materials of other trades better than anyone, except the particular tradesman concerned, and frequently even better than the latter himself.

Having placed this man in charge I would require him to view every proposed repair of any kind with the tradesman concerned if he thought it necessary, and in the case of anything out of the ordinary—by

reason of its magnitude or otherwise—with someone from the real estate office possessing judgment and responsibility to authorize more than ordinary expenditures.

He (the foreman) then having determined what shall be done in the case, having the assistance of the tradesman who will do the work, or in the case of the office employee having been called in for the sake of his judgment, or the authority of his orders, let the foreman then O. K. requisitions for the estimated required materials. The latter can then be obtained by the men who are to do the work.

Should the materials fall short of doing the work the men would have to report to the foreman in order to get further requisitions O. K'd and explanations would then be in order. Were the explanations not satisfactory the foreman could make a personal investigation at once, when it would be possible to see that the material ordered had been properly used and that more was really needed.

The foreman should also see the various items of work performed soon after their completion in order to satisfy himself that all of the materials ordered for a job were used and that any surplus materials were returned to the dealer, brought to the shop, or made legitimate use of otherwise. It would seem that such a course would safeguard the materials and at the same time give each proposed job the benefit of two men's judgment. The mere fact that two men knew all about the proposed job would act as a deterrent to dishonesty in regard to materials.

Now some method or system must be devised to keep check on the time. I would suggest a daily slip to be filled out and turned in at the end of the day or early next morning. This slip should be so arranged that it not only shows when filled out how many hours were worked on a certain job, but at what time of the day the work began and ended. The slip should be "roomy," as in a jobbing business a man is apt to work on several jobs in a day. A rule should be made governing the time going from shop to job or from one job to another. As the man is being paid for this traveling time when it occurs in working hours, it should be equitably distributed over the jobs. These time slips properly made out by the men themselves and plainly marked to show on what job or jobs the time charges, should be O. K'd by the foreman and turned into the office for filing.

The stores furnishing stock on O. K'd slips should send in the slips as vouchers for their bills. Care should be taken to have the stock slips tell the name of the job where the goods are to be used. With the above stock bills, O. K'd vouchers, and the O. K'd time slips, on file in the office, the bills for the jobbing can be accurately made out.

I presume that some stock is carried on hand in the shop. An inventory of this should be made and a ledger account opened under the title "Shop." The stock on hand in shop according to inventory should be appraised at its cost and "Shop" account be charged with value of it. Thereafter any materials taken from the shop should be recorded on a "Shop Requisition" slip and be O. K'd by the foreman and then turned into the office. Any materials left over on a job should be returned to the shop and a "Credit Slip" should go to the office O. K'd by the foreman showing what these materials were and their value. The "Shop" account should be charged with this amount and the job concerned should be credited.

In the case of stock taken from the shop the reverse of the above process would take place in the books; namely, credit the "Shop" account and charge the job concerned.

I think if the above suggestions are adopted, suitable slips being gotten out to meet the requirements set forth and the bookkeeping brought into line with this

system, no trouble would be experienced in keeping men, materials and jobs all straight.

Should this system make enough more work for the carpenter, whom I have chosen to appoint as foreman, so that he cannot always get his own work done, he should be allowed to hire a carpenter for a few days at a time when one is needed.

Winding Stair Rails

From C. F. S., Brooklyn, N. Y.—I notice in the January issue of *The Building Age* a letter from C. C. Grant, Alberta, Canada, who calls attention to my efforts, published in the December issue, to help a discussion of some uncertainty. The question was one of practical importance to hand railers. Denials had followed fast on every assertion "that a plank of the tangent system was sufficiently thick to produce a helical rail." Of this, in neither way, did geometrical proof seem forthcoming.

Under these circumstances I attempted to show the possible truth or otherwise of the above contention. Diagrams, explanations and reasons made up the attempt, and unless some error can be shown in its arrangement what C. C. Grant aptly terms a "demonstration" must be allowed to hold. His letter though expressing complete disagreement with the result only implies that such an error exists. This the writer recognizes is not enough. Much is hoped for by the introduction of an ingenious argument which for a time does succeed in obscuring what it cannot disprove. The advantage secured by this is, however, of short duration and "C. F. S." now begs leave to recant from the opinion dictated by the writer's pen.

Two logical reasons prevent acceptance of the argument his letter conveys; one of these will appear on observing it to be an interesting example of a class of "material fallacies." The fallacy in this instance consists in arguing from a general rule to a special case where an accidental circumstance renders the rule inapplicable.

The circumstance that blocks the application of the rule is occasioned when he supposes the rail or blank to be reduced in size until it becomes a line, and then assumes it is possessing no thickness.

Note that only by this assumption of no thickness in the rail or in the blank, can the inference be drawn that the plank of the tangent system is without thickness, since the general rule of the system always gives to the plank a greater thickness than is possessed by the rail.

Take the experiment he suggests in the November issue of the paper. Will it undeceive me if I take nothing for granted?

Inspection shows it to be imperfect in its analogy. Again the plank is misrepresented. A correction of this will require the two planes being removed farther apart. The distance between them must be equal—not to $\frac{1}{8}$ of an inch—but $\frac{1}{8}$ inch multiplied by the square root of 2.

What reasonable inference may be drawn from this? Does it not appear probable that the discrepancy if corrected may result in C. C. Grant's conversion after all?

Certain it is, however, that a clear demonstration has proved that a correct helical blank is within the surfaces of the tangent plank. This has been shown in regard to one case of rail. Since it is not possible to examine every imaginable case it is sufficient for practical purposes to assume the probability of others. Perfect knowledge cannot be attained.

Will C. C. Grant consider a moment his position? So far he has failed to justify any belief whatever tending to an opposite view of this. Not even a slight probability. How then can he consistently denounce everything in connection with the tangent blank? First

of all by fortifying himself with proof of its worthlessness in one single respect and gradually extending it to include the whole. Until then the recklessness of statements that cannot be upheld must remain unaccountable and the tangent system continue its simple work.

Framing Hammer Beam Roof

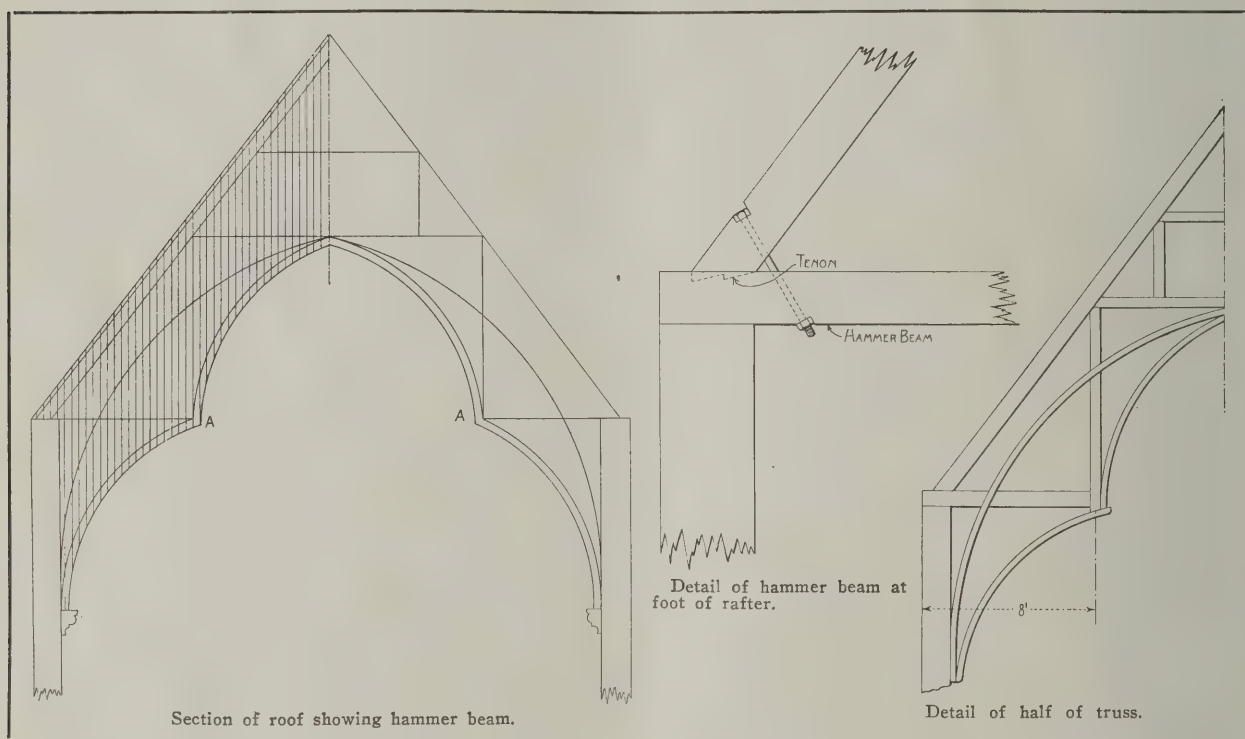
From D. P. Barry, Redford, N. Y.—In presenting his inquiry in the January issue "H. L.," Moorestown, N. J., should have stated the kind of wall on which he intends to place the hammer beam roof. Assuming that it is to be a frame building I will try to help him at the risk of running counter to his specifications. The wall should be at least one foot thick. The hammer beam must rest on top of the plate and keyed with a 2 x 3-in. piece of hardwood as one would case an oilstone. The corbel must be seated on the post. The lower rib must be backed with a ½-in. iron with the ends turned toward the foot of the rafter and bolted to the post and hammer beam. The foot of the rafter

and I will give it the credit of being the best paper of the kind I have ever read. The Correspondence columns are especially interesting, and I consider that department alone is worth the subscription price, to say nothing of the balance of the paper.

I would recommend it to every young carpenter as a mine of information which he cannot afford to do without and the older ones can always find something that is very interesting to them.

The communication of L. H. Hand, Bloomfield, Ind., in the November issue of the paper, was read with much pleasure. It took me back to my early career as I sat astride a boring machine until my back and arms ached, and then "beat out" the mortises, boxed them true to scribe, and then draw-bored and perhaps counter-hewed as a finishing touch.

The art of framing is fast becoming a lost one. Those of us who 40 years ago went to the woods with our axes and hewed out the timbers for some of the huge barns in the Eastern States know something about how it was done. There was no place on the job for



Framing a Hammer Beam Roof—Contributed by D. P. Barry

should be tenoned and bolted to the hammer beam as shown in the detail presented herewith. The other timbers must be mortised and tenoned with care. The short ribs should be set in front of the long one, which should go on both sides of the timbers.

The hammer beam is essentially a lever and the base of a principal rafter which carries a common rafter and purlins for the other rafters, but the details of the correspondent may be somewhat different. The corbel must be large enough to hold the three ribs. Between the short and long ribs it is usually panelled.

The 6 x 10-in. hammer beam should rest on edge and the posts should be at least 14 in. along the wall. The foot of the rafter is framed as if resting on a tie beam.

Practical Value of *The Building Age*

From W. A. B., Todd, Okla.—For the interest which it may possibly have to others I desire to say that I have been a subscriber to the paper for more than 30 years—part of the time through a local newsdealer—

the fellow who used a pencil to lay off his work. The timber had to be taken out of wind, then properly lined and all the laying out had to be done with a scratch awl. The said scratch awl has almost disappeared from the carpenter's tool chest of the present day. As Brother Hand says, "All boring had to be true to line," and if the joints did not fit snug and tight somebody was sure to make very slighting remarks about the workman who did the job. In fact, the old-time framer took as much pride in a fine job of barn framing as any of us now do in a good piece of house finish.

As to the merits of the two systems of barn building, I think the old heavy frame is better than the plank system. I will not, however, at this time enter into a discussion of the merits of the case but will leave that for some of my brother chips who may be more capable of handling it. Suffice to say that in my experience I have never built a barn of that kind that satisfied me as well as the old-fashioned one we built of heavy timbers.

From I. M. B., Point Marion, Pa.—The *Building Age* seems like an old friend to me and I do not want to

miss a single number, as I am one of the oldest subscribers. I picked up the March number for 1879 the other day and I think I have an older copy among my papers. I have taken the paper almost continuously since that time and very often when in need of information I have gone to *Carpentry and Building*, as it was formerly known, to secure what I was after.

Carpenters of the present day have quite an easy time to what we had 30 and 40 years ago, both in the number of papers and books and in the way of working, short hours, etc. I would like to hear from some of the old subscribers through the Correspondence columns of the paper as I have no doubt they can give some interesting experiences.

Remedy for Dampness in Brick Walls

From W. A. D., Madison, Ind.—I desire to ask through the columns of *The Building Age* for a remedy for dampness in brick walls where it comes out above the base and wainscoting and fades the wall paper. The dampness is mostly caused by the brick being near the ground. In one instance there is a cement walk along the wall outside and the basement inside the wall.

I shall greatly appreciate any information which the practical readers of the paper may volunteer on this subject.

Preventing Tools from Rusting.

From W. N. B., Martins Ferry, Ohio.—I have read *The Building Age* for 20 years and have 10 years' volumes on file and still refer to them for information. I am always interested in the Correspondence columns and I claim that *The Building Age* is the best building paper published.

In the January number I notice the query in regard to the best method of keeping tools from rusting. I have worked at the trade for 24 years and have tried almost every kind of oil and grease to keep my tools in shape, for I am a crank on keeping my tools bright and clean. I have found that what is known as "Three-in-One" is the best oil to remove rust or keep tools from rusting. I buy it by the quart.

Let some of the carpenters who complain about their tools being rusty try this oil with a very fine piece of pumice stone and see the results. Keep the tools coated with the oil when not in use and the mechanic will find how easy it is to keep his tools nice and bright.

From Mack & Co., Rochester, N. Y.—We have an excellent method for keeping tools clean and bright which may be of interest to the correspondent asking in a recent issue in regard to this matter, as well as to other readers of the paper.

Our plan is to take six parts lard and one part rosin and heat slowly together until the rosin is all melted, then add benzine to thin it down, in about the proportion of one pint of benzine to one-half pound of lard. Rub over the tools lightly. This last preparation is what we have used in our own works for years. Tools treated with it will resist rust even when immersed in salt water and left for some time.

Plans Wanted for House for Corner Lot

From R. W. A., Union City, Pa.—I wish to build a house on a corner lot, the house to contain five rooms on the main floor, consisting of kitchen, bedroom, dining room, sitting room and parlor. I would prefer a hall also, but on this point I have not definitely decided. On the second floor there should be a bath room and several bedrooms.

Will some of the practical readers who are architecturally inclined kindly furnish for publication in the

columns of the paper floor plans to meet these requirements?

Roofing a Round Silo

From R. L., Brookville, Ind.—I would like to ask the readers of *The Building Age* what is the best way to roof a round silo, also how to cut the rafters to make the roof round.

Knot for Sash Cord

From C. H. S., Paynesville, Ohio.—I notice an inquiry in the January issue for an exclusive knot for sash cord. My method and one that I have used for more than twenty-five years and never saw one come out, is illustrated in Fig. 1 of the accompanying sketches. In making the knot I allow for a loop of about $1\frac{1}{2}$ in., as this permits of a little more freedom in tying. After the knot is made it is pulled tight, and will not come loose.

From Joiner, Clinton County, N. Y.—Answering the correspondent who asked in regard to the matter, I

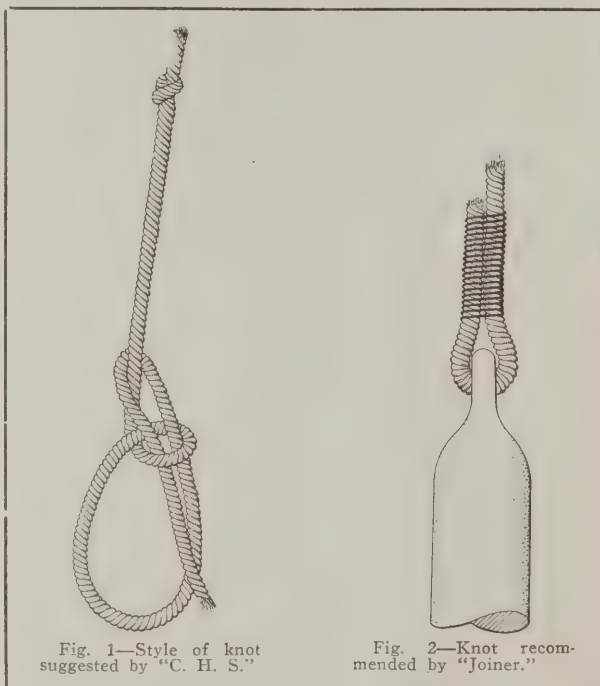


Fig. 1—Style of knot suggested by "C. H. S."

Fig. 2—Knot recommended by "Joiner."

Knot for Sash Cord—Styles of Knot Advocated by Various Correspondents.

would say that the best knot for a sash cord is to run the end through the eye of the sash weight, turn it up a short distance and then wind a wire tight around it so that it will hang plumb as indicated in the accompanying sketch, Fig. 2.

From H. L., Holland, Mich.—I noticed in the issue of the paper for January that "Carpenter," Sheridan, Wyoming, wants to know the best knot for sash cord. If he will take the issue of the paper for January, 1906, when it was known as *Carpentry and Building*, he will there find the best knot for sash cord that I have ever seen. If he ties the knot there shown good and hard it will never slip loose. I have used this knot all the time since I saw it in the paper in 1906.

From W. N. B., Martins Ferry, Ohio.—Answering the question from "Carpenter," Sheridan, Wyo., I would say that the way I always tie a knot in a sash cord at the weight is to run the cord through the weight and tie a single knot in the end of the cord; then make a half hitch around the cord with the end, making a sure hold and giving the weight a chance to hang plumb.

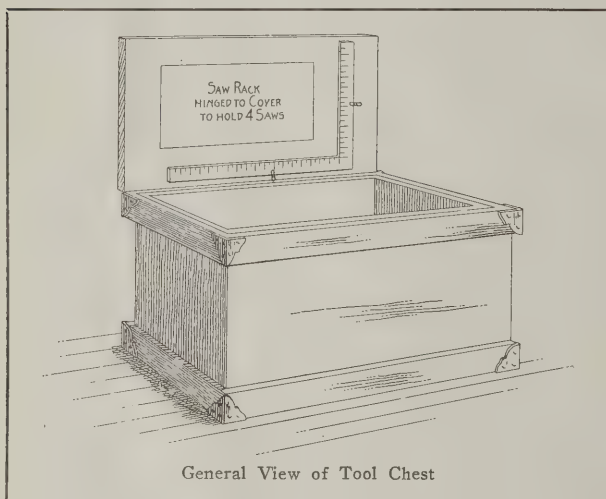
Yellow Pine Timber in Building Construction

From Yellow Pine Manufacturers' Association, St. Louis, Mo.—We note in the December issue of the paper the article under the above title written by John S. Edmund. We believe if you have carefully followed Government circulars you will notice that their tests on heart wood and sap wood for building purposes vary so slightly that they make no such recommendation as stated in the article in question, namely "only the heart wood should be used for building construction."

A long leaf pine as grown in the states of Texas, Alabama, Louisiana, Mississippi, Georgia and Florida contains very little sap wood and is all practically virgin timber. This is sold for hard traffic flooring and structural purposes. The short leaf and loblolly pine is sold for interior finish, dimension boards, siding, lighter constructional material and similar purposes, and actual records show that these pines are very durable either in exposed situations or under cover if properly protected by paint or creosote.

More Correspondence Wanted

From W. N. B., Martins Ferry, Ohio.—I am of the same opinion as "H. F. T.," Winona, Minn., and as one of the regular readers of *The Building Age* feel that the craft should take more interest in asking and answering questions as well as giving their ideas



General View of Tool Chest

Construction of a Tool Chest—Contributed by "R. L."

through the Correspondence Department. This is the portion of the paper to which many of the readers first turn when they receive their copies and I am sure that every one should be sufficiently interested to comment at least upon some of the many questions which are constantly arising in this department.

The present is an excellent time to give our experience for the benefit of others, and I am endeavoring to contribute my mite by offering suggestions regarding a few of the questions which appeared in recent issues of the paper.

Drawings Desired of a Roll-Top Writing Desk

From A. W. S., Paterson, N. J.—As a subscriber of *The Building Age* for a number of years I come to the Correspondence columns for assistance in connection with some work which I am about to do. I would like some reader to send to the editor for publication plans and sectional views of a roll-top writing desk. What I particularly desire to know is how the roll top is put together. Is it weighted or not? If it is weighted,

how is it done, and how is it arranged that all the drawers lock when the roll top is closed.

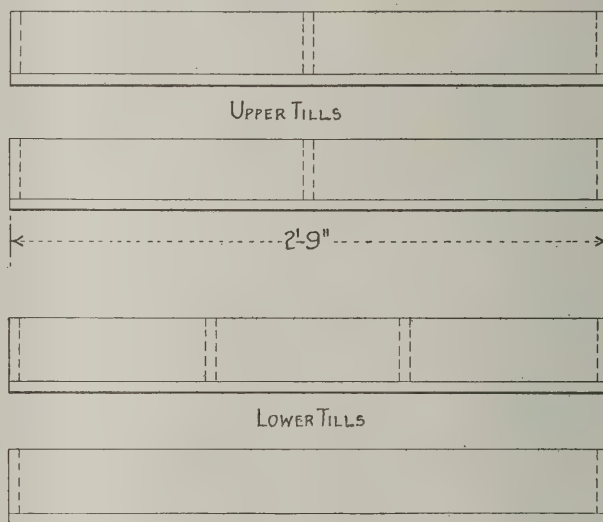
If not too much trouble I would like the correspondent answering these questions to give a complete description of a roll-top desk, with special reference to the roll-top feature.

Construction of a Tool Chest

From R. L., Winona, Minn.—As a young country carpenter I will endeavor to give "F. S." of Michigan a sketch of my tool chest, as it is one I have used three years and have found it convenient in every way. In making the chest I took an 18-in. board and constructed a box 2 ft. 9 in. x 18 in., inside measurements. Then I sawed off 2 in. from the top for the cover, which left it 16 in. deep. I next took $\frac{1}{2}$ x 4-in. pieces to go around the bottom and top and also around the cover. I put on twelve brass corners and covered the top with galvanized iron to render it waterproof.

I hinged a saw rack to the cover to hold four saws, and made a place for the steel square in one corner.

The chest has four tills, made from $\frac{1}{2}$ -in. boards, the tills sliding the long way of the chest. They are 4 in. deep and 6 in. wide, with the top ones partitioned in the center and with two partitions in one of the lower



Side Views of the Various Tills

tills. The other lower till is without any partition and is used for a level or for long bits.

The tills can be used for small tools, and there is about a 6-in. space in the bottom for planes and other large tools. I think the chest will hold about all the tools a working carpenter will need.

I have been a reader of *The Building Age* for about a year and this is my first attempt in answering any questions through the Correspondence columns. I am 22 years old and have worked one summer in the city and two summers in the country. I was born and raised on a farm, and it is my ambition to be something more than a country carpenter.

Now possibly some of the contractors, builders and young architects who are readers of the paper can give me some advice about reaching the goal I have in view and getting in with some firm so as to work my way up. I have often thought there would be no use of going to the city, as there are so many more men in the city better qualified for such places. I would like to hear through the columns of the paper from some of those who are in a position to help a young man such as I am.

PREVENTING SETTLEMENT-CRACKS IN STUCCO HOUSES

Common Method of Framing Each Story Separately—How to Minimize Effects of Settlement and Shrinkage—Use of Crimped Metal Furring

BY ERNEST MC CULLOUGH

THE concrete contractor is often called upon to do work that encroaches upon that of plasterers, in the building of stucco houses, and much trouble is experienced with cracks caused by contraction and expansion of the frame of the building. A builder recently asked an opinion of the writer and gave the following data: I am doing a great deal of building now for people who want stucco houses, but all the houses I have seen with stucco on the outside are badly cracked and I



want to know if a frame house can be covered with stucco without having the stucco crack?

"In this section we frame all our stories separate and set our studding 16-in. center to center. We sheathe the exterior diagonally with boards one inch thick, allowing about an inch shrinkage joint all around the building opposite each floor level.

"On top of these boards we nail strips 1 in. wide by $\frac{1}{2}$ in. thick in the form of squares about 12 in. each way, on top of which we nail our metal lathing. We then plaster the lath with cement mortar in 3 coats, to about $\frac{3}{4}$ -in. in thickness. The work is well done, but is not satisfactory, for when the lumber shrinks the plaster cracks and the building looks badly."

The writer has noticed a number of buildings where the work was done in this manner and is not surprised to hear that results are not always satisfactory. The common method used for framing each story separately is to first lay a plate and on this plate rest the joists for the first floor; on top of the joists a sill is laid and the ends of the studding rest on this sill. On top of the studding is a plate, or cap, and on top of this the ends of the joists for the next floor rest. To carry up the next story a sill is laid on the joists to carry the studding, etc.

Wood does not shrink endways to any appreciable degree, but it does shrink sideways by the drying out of the hollow fibers of which the wood is composed. In the method of construction just described there is a plate with some space underneath, and there is a small space between the joists and the plate, with a third space between the tops of the joists and the sill and a fourth space between the lower end of the studding standing on the sill. Thus at each floor level there are four small spaces, the size depending entirely upon the accuracy with which the carpenter makes his cuts and affected considerably by the roughness of the surfaces in contact. When the building is completed and the floors are loaded some settlement must occur. Plates and sills are generally two inches thick and between them the floor joists are usually ten inches deep. This gives at each floor level 14 inches in which shrinkage can take place and cause some movement in the

framing, in addition to the movement caused by the joints closing up.

To minimize the effects of settlement and shrinkage the buildings should be framed differently. The lower plate should be surfaced and the studding should rest upon it, the joists being placed on the plate beside the studding, instead of under the ends. A sill on top of the joists is then unnecessary and instead of having 14 inches of material with four joints there will be only 2 in. of material with two joints, and as the plate is surfaced, a little care in cutting the ends of the studding perfectly square will reduce the size of each joint. The second story should be framed the same way, a cap being placed on top of the lower studding, on which will rest the studding for the upper floor, the joists also resting on this cap, but beside and not under the upper story studding.

The sheathing should be placed horizontally and not diagonally. (See page 644 of *The Building Age* for December, 1912.) This sheathing is used to carry a lining of paper to make the building tight and should be used for this purpose, without attempting to make it a diagonal bracing for the frame. Diagonal bracing is best made by gaining a 1-in. x 4-in. into the studding

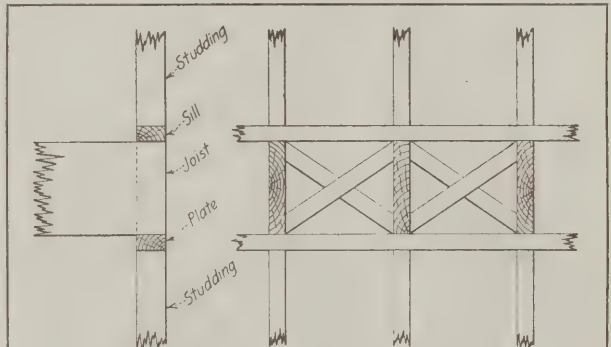


Fig. 1—Side and End Views Showing Old Method of Construction for Frame Houses

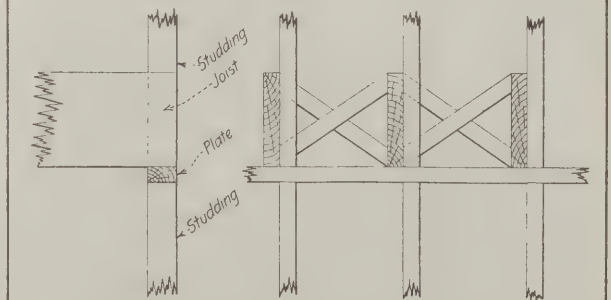


Fig. 2—Modern Method of Construction for Frame Houses—Scale $\frac{1}{2}$ In. to the Foot

Preventing Settlement Cracks in Stucco Houses

or by setting in bridging which can be utilized as a fire stop by putting on a few inches of mortar. Leaving openings for shrinkage at each floor level is not necessary when the boards are placed horizontally, but if no provision is made for settlement and shrinkage at the floor levels it is best made by a method to be described. If the sheathing is placed diagonally it will be impossible to fasten the furring properly.

Boards become narrow when they shrink and when nailed through the center the shrinkage will have a tendency to open the spaces between the boards, the position of the boards remaining unaltered because of the nails in the middle. That this action takes place is shown by the fact that boards used for sheathing with nails driven near the edges, usually crack where the nails are driven. Placing wood lath on the sheathing in small squares makes it a foregone conclusion the shrinkage will affect the plaster. The horizontal strips should be omitted and the vertical strips should be nailed only through the middle of each board, or long nails should be used and the furring strips attached to the studding direct, through the spaces between the boards. When nailed through the middle of the board only, the strips will not move when the boards shrink in from the sides. All danger of movement on the part of the furring strips is removed when they are fastened directly to the studding, for the sheathing boards are then free to move.

The writer does not recommend the use of wood furring strips, for they swell in damp weather and contract in hot weather, with bad effects upon the plas-

furring strips and thus no lines show in damp weather. It makes the plastering more solid and the width of the furring to use depends upon the thickness of finish wanted, there being an air space between the plaster back of the lath and the sheathing, the air space being nearly $\frac{3}{4}$ in. with the 1-in. furring and being practically non-existent with $\frac{1}{4}$ -in. furring. The furring is fastened at the time the lath is applied, the staple going through the lath and on each side of the metal furring, thus saving some labor cost and nails, for staples must be used with metal lath even when wood furring is used, which must be held in place with nails.

The practical man can readily see that when a building is so framed that half the joints are done away with and all shrinkage is carried in one narrow piece, instead of two narrow pieces and one wide piece at each floor, much of the trouble causing stucco to crack is done away with. By fastening the furring in the portion of the boards where no movement occurs when the boards shrink, or by fastening to the studding by nailing between the boards, a further cause of cracking is removed. By using metal furring the damage caused by moisture in wood furring is done away with and the metal furring is held by staples in such a way that some slight movement can take place without affecting the plaster. When all of the precautions mentioned have been taken everything is done that can be done to stop the cracking which is caused by movement in the framing and sheathing.

The term stucco was originally applied to exterior plaster containing plaster of paris, or gypsum. Today the term stucco applies to all exterior plastering work and few plasterers use any gypsum or lime, for cement mortar is the only material that should be used for exterior work. Cement mortar works rather stiffly under the trowel and plasterers do not like to use it. It can be made to work smoothly by rettempering, or by adding not more than 5 per cent hydrated lime, the use of lime being a concession to the feelings of the man applying the plaster; for while he can do a better piece of work without the lime he cannot put on as many yards in a day as when lime is not used.

In spite of all the care used cracks will sometimes appear that are caused by a settlement at floor levels and when the building design permits, a joint can be left around the building at the level of each floor. This joint is made by stopping the furring and lath, leaving a space of nearly one inch between the upper edge of the lath on the lower story and the lower edge of the lath on the upper story. The plastering is done in the usual way and this joint is filled with lime mortar. To conceal the joint a belt of wood is placed around the building, being attached to the upper floor and lapping over the joint on the lower story about an inch, without being nailed on the lower edge. The writer saw one very neat piece of work where the belt was made by plastering the lower story and letting the lath from the upper story lap over it, a sheet of smooth paper being placed under the lath so that when it was plastered upon, the plaster did not adhere to that on the lower floor and a slip-joint was formed.

Since the introduction of I-beams and channels made of very light metal a number of houses have been built with metal instead of wood framing, metal lath being attached directly to the frame. In such houses no cracking can occur because of shrinkage or settlement, if the sections are not too light to carry the loads imposed. Such houses are fireproof, vermin-proof, cool in summer and warm in winter, the cost being very little more than the cost of a frame house in many localities, while in some places such buildings are actually cheaper than a well constructed wood frame building. Unfortunately architects have not as yet viewed the matter with much favor and nearly all houses built in this way have been designed by the engineers of the com-

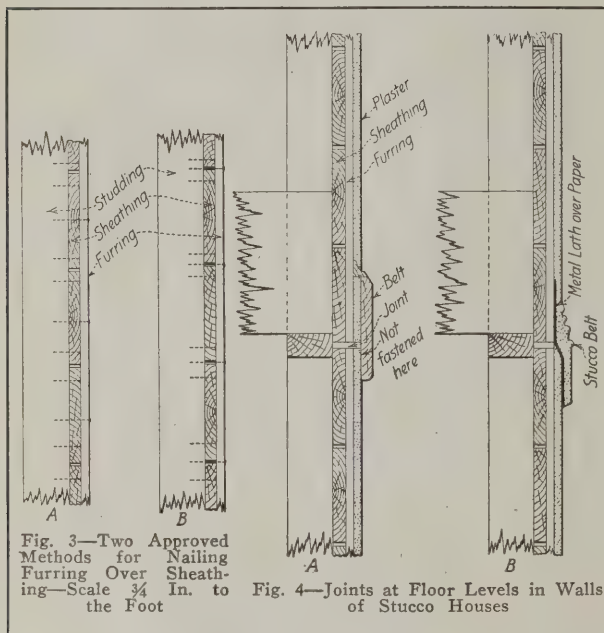


Fig. 3—Two Approved Methods for Nailing Furring Over Sheathing—Scale $\frac{3}{4}$ In. to the Foot

Fig. 4—Joints at Floor Levels in Walls of Stucco Houses

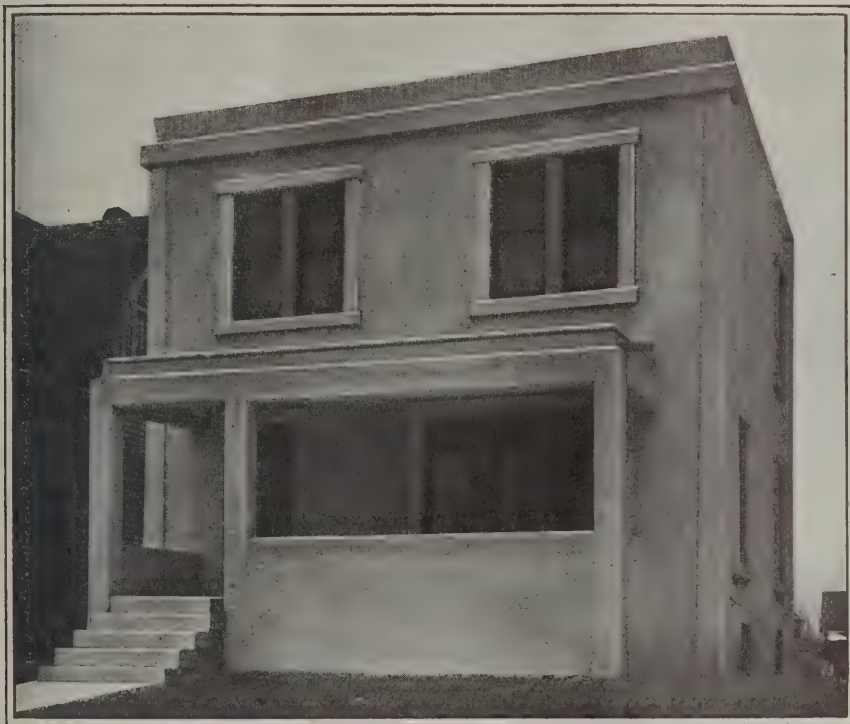
Preventing Settlement Cracks in Stucco Houses

tering. Metal furring strips alone should be used and crimped metal furring is sold by nearly all dealers in building materials. Crimped furring is flat wire or band iron crimped for stiffness. It is set on edge and staples driven through the metal lath hold the furring in place. Crimped furring comes in the following widths: $\frac{1}{4}$ -in., $\frac{1}{2}$ -in., $\frac{3}{4}$ -in., and 1-in. The $\frac{1}{4}$ -in. weighs 1/20 of a pound per foot, 50 lbs. being required when set on 12-in. centers and 37 lbs. being required when set on 16-in. centers, for 100 sq. yds. of metal lath. The $\frac{1}{2}$ -in. width weighs 1/18-lb. per lineal ft. and 40 lbs. are required when set on 12-in. centers and 34 lbs. when set on 16-in. centers. The $\frac{3}{4}$ -in. furring weighs 1/15 lbs. per ft. and 67 lbs. are required for 12-in. centers and 45 lbs. required for 16-in. centers. The 1-in. furring weighs 1/10 lb. per lineal ft. and 90 lbs. are required for 12-in. centers and 67 lbs. for 16-in. centers. The staples for above work are from 1 to $2\frac{1}{2}$ ins. long and the following quantities are required when furring is set on 16-in. centers: 1 in. long, 10 lbs.; $1\frac{1}{4}$ ins. long, $12\frac{1}{2}$ lbs.; $1\frac{1}{2}$ ins. long, 15 lbs.; 2 ins. long, 40 lbs.; $2\frac{1}{2}$ ins. long, 50 lbs., for 100 yds. of metal lath.

The use of crimped metal furring does away with the one inch width of plaster that rests upon wood

panies selling the material, the total absence of architectural beauty being a marked feature. The building herewith shown was constructed with all the framing of metal lumber, even to the floor and roof joists, the picture being reproduced from a photograph kindly loaned to the writer by the Northwestern Expanded Metal Company, this company furnishing the metal lath and the Berger Manufacturing Company, the metal lumber.

While the house illustrated in the last picture in connection with this article may not appear attractive to many readers because of its exceedingly plain outlines, yet in reality it looks much better than one would suppose. The cost was about 5 per cent. less than that of a brick veneer building erected from the same drawings; that is, bids were taken for the building constructed of brick and also of brick veneer for purposes of comparison. The only wood in the house as it stands are the window frames, sash, doors and the floors, the latter being covered with wood carpet.



Preventing Settlement Cracks in Stucco Houses

The building was erected precisely as a wooden frame structure would be built with studding and joists. The difference between it and a wooden building is that the studding is of light steel and the joists are Berger metal lumber. The floors are of reinforced concrete and the walls and ceilings are plastered with cement mortar on expanded metal lath. On this building there need be no insurance and the contents carry the very lowest rate. In its erection the blacksmith's shears and the tinner's snips took the place of the carpenter's saw, while wire took the place of nails and pliers supplanted hammers.

Henry Carey Baird, for many years a publisher of industrial and technical books in Philadelphia, died December 31 at Wayne, Pa., aged 87 years. In October, 1841, he entered the publishing house of Carey & Hart, Philadelphia, which had been founded by his grandfather Mathew Carey, in 1785, and in the course of time established his own business. He took a deep interest in public questions, and frequently issued pamphlets in which he discussed current topics. He was especially interested in political economy and finance.

Best Way to Finish Oak with a Polish

A painter in one of the Western States having to do a job involving the finishing of oak with a good polished surface, wrote the *Painters' Magazine* for information. In reply to his questions the authority named offered the following:

First have the wood well sandpapered, cleaning up any soiled places; then thin a good mineral paste wood filler (that made with straight silex in the pigment being best) with pure turpentine to the consistency of medium bodied varnish; apply it with a good brush and rub it well into the grain and pores of the wood. When fairly well set, which is when it begins to show flat, you can rub it into the wood with a pad made by glueing leather onto a block of wood, always rubbing across the grain. For round moldings of balustrades have a long strip of leather to draw back and forth around the work. Fill only as much surface at a time as you can wipe off before it sets too hard to wipe off

without rolling up. Wipe off with tow or excelsior shavings all the filler except that which is in the grain or pores, and be careful to have all the grain and pores level full of the filler, because upon that feature the success of your work depends. All rubbing and wiping must be done across the grain. Give the filler all the time to dry you can, but never less than thirty-six hours, especially where the grain is rather open. When dry go over it lightly with No. 0 sandpaper to take off every particle of filler left on the surface. The cleaner you wipe off the filler the cleaner the finished job will be. If you desire your oak stained it is best to have the paste filler colored, and you can obtain it from the manufacturer in the natural, in antique, golden or weathered effect, so that you need not stain the wood first.

If you want to do high-grade work it is well to examine the filler surface with a magnifying glass to see if the pores are well filled and no pinholes visible.

If there are such defects it is best to go over the surface with the filler a second time, but have it of thinner consistency than at first, and repeat the operation of rubbing, wiping off and sandpapering. Now you can apply one or two coats of white shellac, which, when hard, rub down with fine sandpaper; then put on a coat or two of hard oil finish or cabinet rubbing varnish and rub down with curled hair or hair cloth to dull the gloss. The shellac varnish may be omitted, but in that case an extra coat of varnish will be needed.

If you want merely a good eggshell gloss rub the last coat with raw oil and flour of pumice and wipe dry with soft cloth. For a good polish rub with flour of pumice and water first, then wipe dry and polish with rotten stone and sweet oil.

For high luster apply a coat of cabinet finishing varnish on the rubbed varnish surface and omit rubbing this.

A number of workingmen's houses are being erected in Northampton, England, some of which are intended to rent for \$1.34 and others at \$1.58 per week, each house having a frontage of 15 ft.

FRAME BUNGALOW IN SOUTHERN CALIFORNIA

An Interesting Example of This Cozy-Cottage Type of Dwelling—
Floor Plans and Interior View

THE extent to which this type of attractive cozy dwelling has been erected in the section of country indicated has caused many to regard Southern California as the "Heart of Bungalow Land." Here are to be found practical examples of this style of habitation in great profusion and involving all sorts of architectural treatment. For the most part they are designed for permanent occupancy, although some are built for use only during a portion of the year, yet the climatic conditions of that section of the country are such that the difference in purpose would involve

and the door leading into the central hall just beyond the fireplace. This fireplace is the first thing that strikes the eye of the visitor upon entering the living room, the construction being of what is known as "blue brick." The same kind of material is used for the porch columns and the name is derived from the fact that as they are the ones in the kiln placed nearest the flues they are burned harder, giving them a dark red, almost bluish cast. They are burned so hard that they are from $\frac{1}{8}$ to $\frac{1}{4}$ in. smaller all around than common brick. Opposite the fireplace on the other side of



Photographic View of Frame Bungalow in Southern California—Architect L. A. Clarke, Los Angeles, Cal.

comparatively little variation as regards construction and arrangement. The climatic conditions too are favorable to economical construction owing to the fact that little or no cellar is necessary; the heating apparatus outside of a capacious open fireplace in the living room may be dispensed with and interior plastering is not always imperative.

Among the more recent examples of convenient bungalow construction is that illustrated herewith and which was built for Mrs. A. M. Hall in Los Angeles, Cal. The house faces east with the principal view toward the north, the arrangement being such as to take advantage as much as possible of the beautiful mountain view which is afforded by the location of the site. The front porch is wide and spacious and being on the east side is well protected from the sun.

The half tone illustrations afford an excellent idea of the general appearance of the finished structure and also a view in the living room looking toward the fireplace with a glimpse of the dining room at the right

the room are a seat and a bookcase, while beyond this is a coat closet.

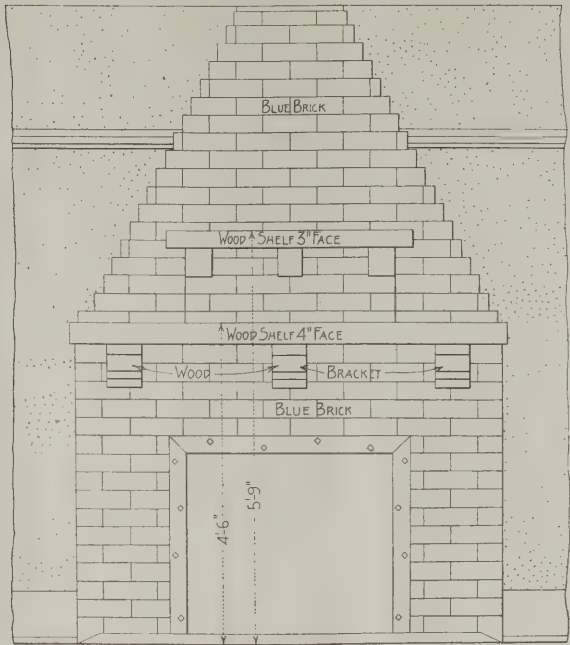
The dining room communicates with the living room through sliding doors and has at the left a built-in buffet of simple design and with a spacious countershelf. Above the countershelf are cupboards with glass doors, while below are knife and linen drawers and lockers. The walls of the dining room are finished with a wainscot panel 4 ft. 6 in. high, above which is a neat bracketed plate rail.

The living and dining rooms are finished in selected slash grain Oregon pine carefully matched and fitted together. The doors are of the same material all carefully selected and the whole is stained a beautiful rich brown, giving a very pleasing effect, in combination with the dark red of the brick fireplace and dark red cement hearth.

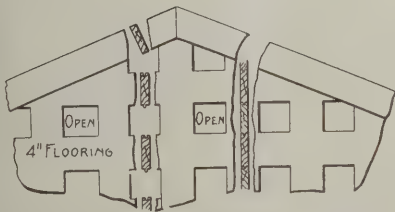
From either the living room or the dining room one may enter the hall from which communicate the two sleeping rooms and the bath room. In fact from the



Floor Plan.—Scale 1/16 In. to the Foot



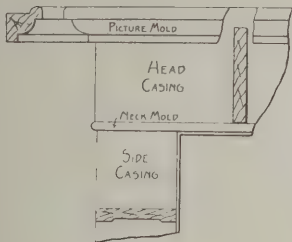
Fireplace—Scale 3/4 In. to the Foot.



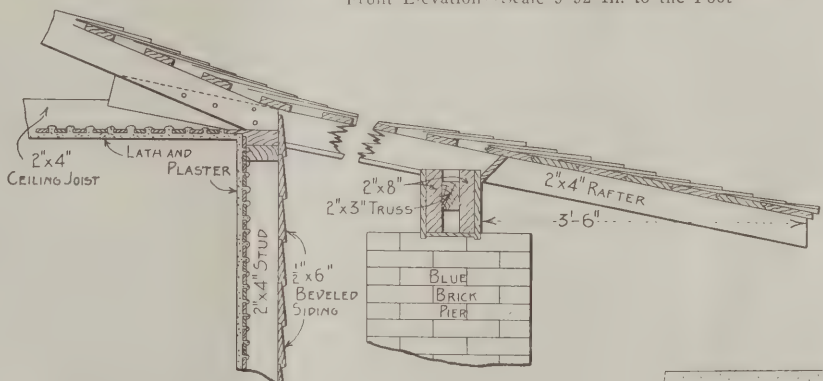
Gable Ventilator—Scale 1/2 In. to the Foot



Front Elevation—Scale 3/32 In. to the Foot



Details of Interior Trim—Scale 1 In. to the Foot

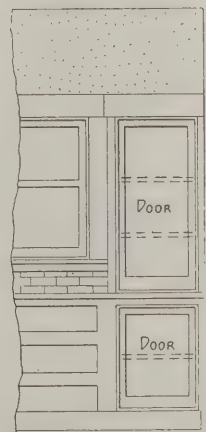


Section Through Main Wall, Plate Ceiling and Roof—Scale 1/2 In. to the Foot

Section Through Porch Girder and Roof—Scale 1/2 In. to the Foot



Side (Left) Elevation—Scale 3/32 In. to the Foot.

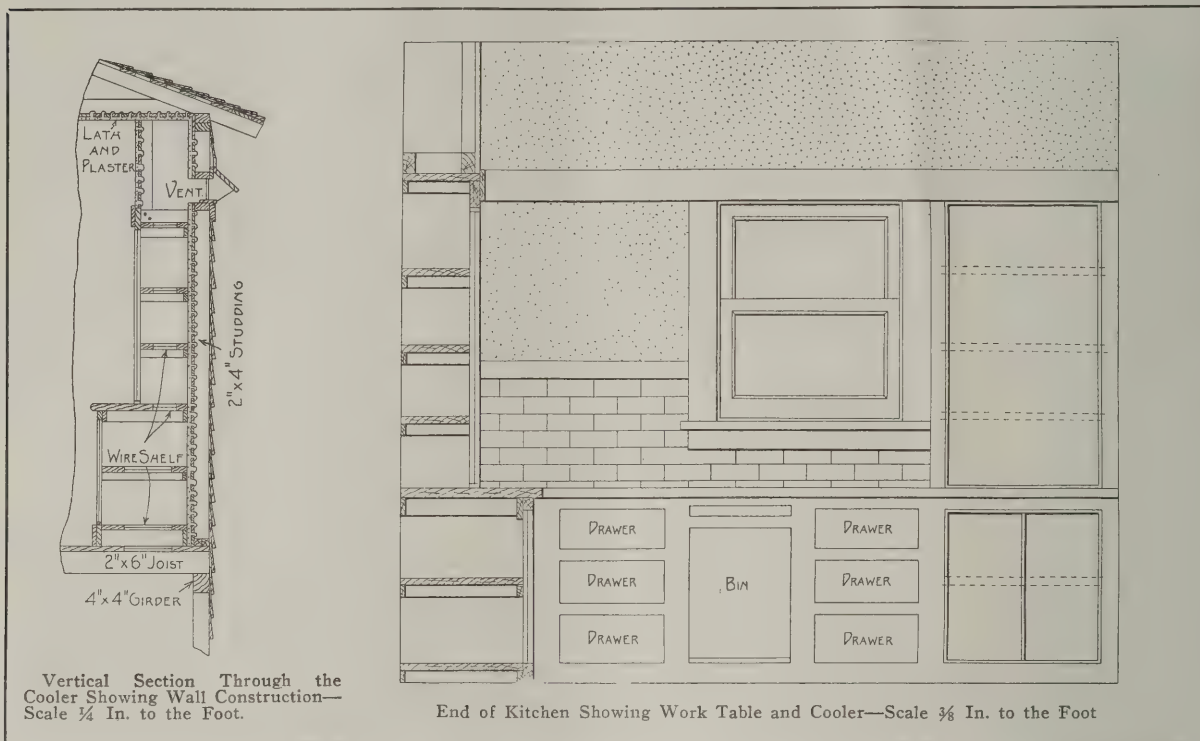


Elevation of Cooler—Scale 1/4 In. to the Foot.

central hall all rooms on the floor may be directly reached. On one side of the hall are the linen lockers which were made very deep and roomy so that linen can be put away without much folding. On the opposite side of the hall is a small closet used for brooms, etc. The hall is finished in the natural wood—Oregon

making the former a well lighted room. A built-in work table is placed directly under one of the windows through which is obtained a beautiful view of the mountains. In the work table are built-in bins, drawers, lockers, bread-cutting boards, etc.

Under the two windows on the west side of the



Vertical Section Through the Cooler Showing Wall Construction—Scale 1/4 In. to the Foot.

End of Kitchen Showing Work Table and Cooler—Scale 3/8 In. to the Foot



Frame Bungalow in Southern California—Miscellaneous Constructive Details; Also Photographic View in Living Room Looking from the Front Entrance Door

pine. There is a sash door separating the hall from the screen porch, thus lighting the hall.

The kitchen communicates with the dining room through a double acting door and there is also a sash door between the kitchen and the screen porch, thus

house is the sink with drain board, while at the right and left are cupboards, etc. Near the outside door and only a step from the stove is the closet for kitchen pots and kettles.

The "California Cooler" is built in on the north side

with a vent at both top and bottom. The vents are covered with wire cloth. The shelves are simply a wood frame covered with $\frac{1}{4}$ in. mesh wire cloth affording a good draft and making a cool place in which to keep milk, butter, eggs, etc., etc. A detail showing a section through the wall of the bungalow and of the cooler is presented on another page. Opening from the screen porch is a store closet provided with shelves, etc. On the porch are also the wash tubs, or trays as we more often designate them.

The whole house is plastered on the inside with two coats of hard wall plaster finished rough and tinted. The plaster wainscot in both the kitchen and bath room is marked off to imitate tile.

The framing material used in the construction of the house includes mud sills of 2 x 6 in. redwood; posts 3 x 4 in. Oregon pine; girders 4 x 4 in.; joist 2 x 6 in.; exterior studs 2 x 4, interior studs 2 x 3 in.; rafters 2 x 4 in. Oregon pine; ceiling joist 2 x 4 in.; sheathing boards 1 x 4 in., and siding $\frac{5}{8}$ x 6 in., rabbeted.

The redwood shingles which cover the roof are laid $4\frac{1}{4}$ in. to the weather on sheathing boards placed 4 in. apart. No building paper is used except under the hardwood floors.

The front door is $1\frac{3}{4}$ in. thick veneered on both sides with slash grain Oregon pine. The inside doors are five-panel type Oregon pine, $1\frac{3}{8}$ in. thick. The outside of the frame is covered with rabbeted siding and stained a light brown with the trim a few shades darker brown.

The bungalow here shown was designed by Louis A. Clarke, 417 Belmont Avenue, Los Angeles, Cal., and the contract was executed a few years ago by C. A. Love, 654 East 37th Street, Los Angeles, for a trifle over \$1,500, which included cement sidewalks, a woodshed and fence.

Sand Foundations for Tall Buildings

It is a well-known fact that sand can sustain very heavy loads with comparatively little or no compression and when it directly overlays rock or other thick, hard stratum that is securely confined or otherwise protected against the possibility of lateral displacement it forms a very satisfactory foundation and will carry with safety heavy loads as long as these conditions are maintained. It is for this and other reasons that many heavy buildings of moderate height have foundations resting on the sand usually only a few feet below the surface. Almost all of them are at or above ground water level. Heretofore they were made with timber and masonry footings, then of concrete, and now almost entirely of reinforced concrete or steel beams enclosed in concrete.

It is the general practice to support the columns of a building singly or in small groups on isolated separate footings proportioned to reduce the loads to substantially the same unit pressure on all.

When the 15-story Spreckels Building was erected in the city of San Francisco some 15 years ago it was built with all of its columns seated on a double grillage of continuous I-beams reaching entirely across the site in both directions and embedded in a mass of concrete more than $4\frac{1}{2}$ ft. thick resting on wet sand 25 ft. below the surface of the street. In the case of the 26-story St. Paul building at Broadway and Ann Street, in New York City, the columns have steel beam and girder grillage with concrete footings on the wet sand about 30 ft. below the street. The *Engineering Record* states that the sand was loaded to 8,000 lb. per sq. ft. and in several years has settled only a fraction of an inch and with such regularity that it has been unnecessary to adopt the special provisions designed for compensating irregular or excessive settlement.

In the new Municipal building spanning Chambers

Street on Center in New York City, a part of the foundations is carried to solid rock and part is supported on wet sand nearly 90 ft. below the surface. As this building is 25 stories high and has a 15-story central tower rising to a height of 580 ft. above the street, the pressure on the sand is 12,000 lb. per sq. ft.

The foundations of the 32-story building in the city of Cincinnati consist of steel grillages enclosed in concrete and imposing a load of 11,000 lb. per sq. ft. on dry sand about 50 ft. below the street. In this case the foundations carry an estimated total load of about 104,000,000 lb. and occupy about 70 per cent of the entire area of the building.

Condensation Under Concrete Roofs

During the last year there has been considerable discussion in regard to the prevention of condensation under concrete roofs, and it is therefore interesting to note the remarks in this connection of Leonard C. Wason, a well-known authority on the subject. He states that under a concrete roof, if the air is moist and hot, as it is in the principal part of a paper mill when the weather is cold outside, provision must be made to prevent condensation. Even with the best provision it is necessary in some places to provide for adequate ventilation, as dripping will occur whenever the air reaches the dewpoint. A thick concrete slab requires some insulation even under only moderately bad conditions of dampness inside the building.

Some of the roofing companies provide roofing felt, which goes on under the regular waterproofing of the roof surfaces. The disadvantages of this felt come from the fact that it is soft, and walking on the roof, or particularly moving any heavy weight about on it, will cut the roofing very readily. There is also the question of the permanence of the materials used in the felt. The cheapest and one of the most efficient methods of insulation of which Mr. Wason has knowledge is to use on top of the roof slab a filling of porous concrete, made up of screened cinders and cement.

W. H. Ham, of the engineering office of French & Hubbard, Boston, specifies, as below, for such filling. His object is to get as spongy, porous material as possible and one that will have some cohesion, enough so that the roofing felt can be mopped down onto it, with the hope of its setting in position.

Cinder Fill.—Concrete roofs shall be covered with a cinder concrete fill of thickness as shown. This fill to form crickets and other grades as indicated; minimum thickness, however, to be not less than 3 inches.

"Concrete for this work shall be mixed with one part by volume of Portland cement, fulfilling specifications required for other portions of the building work, and not more than ten parts by volume of clean, steam boiler cinders.

"The fill shall be placed as carefully as possible, so as to be left porous. After the fill has set up sufficiently to work over, the top surface shall be trowelled over with a flat coat of mortar to give a proper surface for the tar and gravel or other rolling material."

The Aberthaw Construction Company, of which Mr. Wason is president, has had difficulty with roofs on which furnace slag has been used and which was covered with an inch or more of sand finish, as the finish has expanded in the heat of the summer and has cocked up in big blisters.

The plans for improving the southeast corner of Amsterdam Avenue and 74th Street, New York City, which have recently been filed, call for a twelve-story apartment house estimated to cost \$50,000. The building will have a frontage of 100 ft. on the avenue and 107 ft. on the street and will replace five flat houses.

ESTABLISHED 1879

THE BUILDING AGE

Formerly CARPENTRY AND BUILDING

Copyright, 1913, by David Williams Co.

Entered at New York Post Office as Second Class Mail Matter

Published Monthly by the

David Williams Company

239 West 39th Street New York

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Subscription Rates: To all parts United States and Mexico, \$1.00 a year; to Canada, \$1.25 a year; to all other countries, \$2 a year.

February, 1913

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Our Cover Designs

Probably no one of the many improvements which have been made in the typographical appearance of the paper since it was known under the name of *The Building Age* has received more frequent complimentary reference from our friends and patrons than the cover designs which have appeared in colors. These have been of a widely varying nature, representing for the most part the conception of the artist rather than typifying houses actually erected, although they may easily have been such. In the instances in which the cover design represented actual construction the plans, details and memoranda specifications were to be found in the reading pages. The architectural studies have been of an unusually striking and attractive character, especially so during the last few months. The one which embellishes the front of the present issue is by the same clever designer who conceived the wintry scene appearing on the cover of the January number, and by a singular coincidence copies of *The Building Age* just from the press and carrying this snow-laden scene were displayed upon the news stands of the city on the very morning of New York's first blizzard of the winter. The design was most appropriate for the occasion and the coincidence has been the basis of frequent and interesting comment on the part of friends and patrons of the paper. Other designs which have been prepared for forthcoming issues will, we trust, meet with equally favorable consideration at the hands of our friends.

Building Operations in 1912

Reports which come to us from leading centers of the country indicate that the year just ended has been notable in the amount and value of its building construction. In many instances new records of activity have been established, due in large measure to the steady growth of the community and the constantly increasing requirements in the way of business and housing accommodations. Locally, building operations in the year just closed were upon a scale which compares most favorably with similar periods in the past. The official figures for four of the boroughs of Greater New York show permits to have been issued for 21,729 new buildings and alterations, involving an estimated outlay of \$223,694,368, while in the corresponding twelve months of 1911 there were 21,084 permits taken out, calling for an estimated expenditure of \$195,627,037. Of these totals the boroughs of Manhattan and the Bronx accounted for 8,283 permits and \$163,519,362 in estimated cost, and contrast with 6,496 permits for building improvements costing \$135,703,715 in 1911. In Brooklyn there was an appreciable increase in the value of the buildings for which permits were taken out, although the number was somewhat less than in the year previous. The report of the superintendent of the Bureau of Buildings for that borough shows that last year 8,625 permits were issued for construction work estimated to cost \$40,537,784, as against 9,273 permits for new buildings and alterations costing \$37,711,067 in 1911. For some years past the borough of Queens has shown unusual activity in the building

of homes, due to the rapid development of sections previously used as farm lands. In the early months of last year, however, there was a falling off in the amount of capital invested in building work, which was ascribed to the uncertainty of the rapid transit situation in the borough. Since actual steps were taken two or three months ago looking to the building of the transit lines in that section there has been a revival in building operations, and new records for the last months of the year were established. The figures show that 4,821 permits were issued for new buildings estimated to cost \$19,642,222, whereas in 1911 there were 5,313 permits taken out for building improvements costing \$22,212,255.

Classification of Buildings

An analysis of the figures for the year reveals some rather interesting comparisons. In the borough of Manhattan, for example, which shows the estimated cost of 757 new buildings planned to have been \$116,325,135, there were 48 office buildings projected, estimated to cost \$30,501,000, while in 1911 there were 51 buildings of this class planned to cost \$19,591,800. Another feature of last year's report is the increased cost of store and loft buildings, of which 156 were planned, to cost \$29,864,200, while in the year before 175 buildings of this class were planned, estimated to cost \$20,943,100. In the way of apartment houses last year showed 182 to have been planned, costing \$30,452,000, as against 194 such buildings planned in 1911, to cost \$29,178,000. Last year there were 26 public buildings planned, costing \$2,204,000, as against 17 in 1911, costing \$1,293,300. Although private residences are not being erected to the extent they were years ago, yet last year 28 were planned, involving an estimated cost of \$1,532,000, while in the year before 39 private dwellings were planned, to cost \$1,263,500. The feature in the borough of Bronx was the brick tenements or flats, of which 606 were planned, costing \$25,184,500, while in 1911 there were 370 brick tenement houses for which permits were issued, estimated to cost \$14,489,500. The cost of factory buildings in 1912 exceeded the cost of 1911 by about \$800,000, while public buildings, covering municipal and places of amusement, represented more than \$3,500,000 as compared with \$2,048,250. A vast amount of work has been planned for execution during the current year, and this will keep the various trades active for a considerable period, so that 1913 may be said to start off with bright promises for the future.

Architectural League of New York

In accordance with previous practice various prizes and medals of honor will be bestowed for architecture, painting and sculpture in connection with the twenty-eighth annual exhibition of the Architectural League of New York, which will be held in the building of the American Fine Arts Society, February 2 to 22 inclusive. What is known as the Henry O. Avery Prize, together with a special award of \$300, are offered this year by the League to architects, sculptors and painters for the best design for an end wall of a railroad wait-

ing room, measuring 40 ft. high by 100 ft. long and having a monumental clock as a central feature. It is required that the design be placed on a plaster background furnished to competitors by the League. The architect is to display his designs either in the flat or in the solid upon this background, while the painter must apply his cartoon to it and the sculptor must place his work in its proper relation to the whole, all at the same scale of $\frac{3}{8}$ in. to the foot. The judgment of the committee will be based on the total effect of the design as a whole and the degree of successful collaboration of the competing groups. The Avery prize will be awarded on the sculptural element in this program. Another feature of the annual exhibition will be a series of lectures on various topics by well-known members of the profession.

No Heat No Rent

Failure to heat an apartment properly has resulted in a tenant in New York City being relieved by the court of financial obligation for rent accrued while the apartment was unsatisfactorily heated even though he occupied it. By a decision of the Supreme Court he was also relieved of any responsibility for the unexpired lease at the time he vacated the apartment because sufficient heat was not being supplied to make the apartment comfortable. This decision might with profit be brought to the attention of landlords in a diplomatic way by heating contractors generally. If a landlord knows that his right to collect rent is being endangered by lack of proper heating facilities he is likely to require the services of a heating expert. Like the early bird, the man who is awake early is more than likely to profit by the landlord's needs.

Officers American Institute of Architects

At the forty-sixth annual convention of the American Institute of Architects held in the city of Washington the middle of December, the following officers were elected for the ensuing year:

President.....Walter Cook of New York.

Vice-Presidents.....R. C. Sturgis of Boston.

F. C. Baldwin of Washington.

Secretary-Treasurer..Glenn Brown of Washington.

During the convention it was announced that a monthly publication to be known as the "Journal of the American Institute of Architects" will take the place of the "Quarterly Bulletin" heretofore issued.

Early Use of Iron Work in Building Construction

While the work of demolishing the ruins of what was once the Equitable Building in lower Broadway, New York City, was recently in progress, there were revealed many interesting reminders of the early use of iron work in connection with building construction in the metropolis. The steel skeleton frame, with which all are now so familiar, represents a big advance upon the methods prevailing at the time the Equitable was erected, yet some of the ideas embodied in that building are still to be found in connection with the work of the present day. As an example one may cite the method of anchoring the I-beams used in the floors. These were supported at either end by blue-stone templates in the brick walls and anchored by

strap-irons to pins set upright in the brickwork. This method is still regarded as the best practice in this class of construction.

When the Equitable Building was commenced nearly 50 years ago there were only five other buildings in New York City which contained iron work. They were the first in which iron floor beams were used in this country and were probably the first in the world to use rolled beams; cast-iron girders, however, had been used to a limited extent in some English buildings. The I-beams had just been perfected by Peter Cooper, who invented it, writes M. A. Brooks in the "Engineering News." Mr. Cooper had a few years before been commissioned to render fireproof the floors of Nassau Hall, a stone building at Princeton College, which result he accomplished by the use of railway rails. He was then about to build his great gift to the people of New York City—Cooper Union—and in it he used the first I-beams ever rolled. In that building the beams were used just as wooden floor joists had heretofore been utilized, being spaced at fixed distances apart without reference to their strength or the load they were to carry. By this practice much iron was of course wasted.

The plans for the Equitable Building were selected as a result of the first architectural competition in the history of the New York building trade. When the Equitable Building was planned the limit of height in New York City was four stories, for tenants could not be induced to climb higher. Only three elevators were in use in the city, one being in the Fifth Avenue Hotel and one in the Astor House, the cars being raised and lowered by the operation of a long screw which passed up through the center of the cage. The third was a car in an apartment house which was lifted by a rope cable by steam power.

In making the plans for the Equitable Building, the vice-president of the company strongly maintained that by means of elevators tenants could be attracted to the upper floors, in which view George B. Post, then a young man and who had been placed in charge of the iron work, elevators and vaults, coincided. Approval, however, of this revolutionary innovation was not easy to obtain, but it was ultimately secured and the installation of the original elevators were the first commercial elevators used in America.

Pueblo's New Court House

The recent completion of the Pueblo Court House, Pueblo, Col., is another step towards making that city one of the finest in the West. In the construction of the Court House a product of Pueblo county played an important part, the material being Turkey Creek stone of which the building was entirely constructed.

The dimensions show the length to be 330 ft. and the width 100 ft., with a basement 12 ft. deep. The exterior of the building is of Turkey Creek white sandstone, the structure being of Corinthian architecture and strictly fireproof. It has a rotunda about 40 ft. by 40 ft., partly octagonal, over which is a magnificent dome, the top of it being about 112 ft. above the street level. The rotunda and dome are very richly embellished with columns, pilasters, pendentives, etc., all of which are of rich taste. The wainscot in the rotunda is of Yule white marble, this being a Colorado product. The main stairways are of Tennessee marble, while other stairways are of iron railing, etc., with marble and slate treads. The framework throughout is of steel; the floors are of reinforced concrete, and the finish of Turazza marble and cement.

The building contains about seventy rooms in all, including three large and handsome court-rooms and offices for the use of the county officials. The interior finish throughout is of white oak. There are ten com-

modious vaults, equipped in the most modern fashion with metal furniture. In fact the building throughout is more or less furnished with metal furniture made by the Art Metal Construction Company, of Jamestown, N. Y., the cost being \$55,000. The wood furniture, of which there is an excellent display, was supplied by the Wallarger Manufacturing Company, of Milwaukee, Wis., costing \$27,500. The lighting fixtures figured at \$20,000 and were put in by the Morreau Company, of Cleveland, Ohio, the total cost of the building and equipment being approximately \$750,000.

The building was planned by A. R. Ross, of New York, and G. W. Roe, of Pueblo, Col., associate architects, and was built under the personal supervision of Mr. Roe. The general contract for the building was let to Frank Taylor, of Pueblo, Col.

Rule for Finding Size of Furnace for Dwelling House

Very often the builder is interested in knowing just how to find the size of furnace that is required to heat a dwelling house which, for example, he may be erecting, and he will therefore be interested in the rule which follows for finding the size of hot-air furnace for a dwelling house of ordinary wooden construction so as to provide a comfortable temperature within while the thermometer outside may register zero. The rule, which we find in a recent issue of the *Sheet Metal Shop*, is as follows:

Most rules for the size of a furnace are based upon the cubic feet of space to be warmed. While rules of this kind may be safely employed by experienced men, they are not so well adapted to general use. This is because they do not take into account the exposed wall and window surface, which is not always proportional to the cubic contents. The following method is based on the assumption that the outside wall constitutes five-sixths of the total exposure, while one-sixth is made up of glass; with a heat loss of 19 thermal units per square foot of wall surface per hour and 85 thermal units per square foot of glass. It also allows for an increase of 20 per cent. for leakage, 16 per cent. for exposure to winds, and 10 per cent. for the heat loss through attic. The combined effect of these losses amounts to 45 heat units per hour per square foot of gross outside wall surface (including glass).

If the air comes to the furnace at zero, the heat loss, as computed above, must be multiplied by 2.4 to allow for the heat required to bring the entering air up to the temperature of the room (70 degrees).

Having determined the total number of heat units to be provided for per hour, the square feet of grate surface in the furnace may be found by dividing the factor given in the second column of the following table, which corresponds to the limits of the grate area as given in Column 1:

Limits of Grate Area.	Factor.
1 to 4 square feet.....	24,000
5 to 10 square feet.....	32,000
11 to 15 square feet.....	40,000
16 to 20 square feet.....	48,000

Example.—A dwelling house has a total outside wall and window surface of 2000 sq. ft. What should be the grate area to maintain an inside temperature of 70 degrees in zero weather?

$2000 \times 45 \times 2.4 = 216,000$ thermal units to be provided by the furnace per hour. Dividing by 32,000 as a trial divisor, we find that $216,000 \div 32,000 = 6.75$ sq. ft. of grate surface are required, this coming within the limits for this divisor, as given in Column 1.

Trouble from porosity may generally be avoided by applying a good rich well proportioned concrete.

IMPORTANT COURT DECISIONS DURING 1912

Enforcement of Mechanics' Liens—Rights Under Building Contracts—Architect's Relation to Builder

BY A. L. H. STREET

THE building trades having contributed many, though only a very small percentage of all, of the controversies which were before the Appellate Courts of the country during the year 1912, we here present an epitome of some of the most important decisions rendered; the name of the court, the title of the case and the place in the law reports where it can be found reported in full, appearing after each legal principle decided.

Destruction of a building by fire before filing of a claim for a mechanic's lien defeats the builder's right to enforce a lien. (California District Court of Appeal, *Kern vs. San Francisco Company*, 124 Pacific Reporter, 862.) A contractor did not lose the right to a lien for labor unfurnished, though the labor and materials were furnished under an indivisible contract, and he was not entitled to a lien for the materials. (Washington Supreme Court, *Heim vs. Elliott*, 119 Pacific Reporter, 826.) A builder, who contracted to construct five dwelling houses, was not entitled to enforce a lien where he failed to segregate the accounts against each of the several pieces of property. (Washington Supreme Court, *Sarginson vs. H. S. Turner Investment Company*, 124 Pacific Reporter, 379.)

In a case where construction work required by a contract was completed July 28, no lien was acquired under the laws of New York by filing a notice of lien on November 29, though additional work, for which no charge was made, was done after July 28. (New York Supreme Court, *Friedman vs. Lowenstein*, 135 New York Supplement, 569.)

Where, under a single contract, work was performed on separate buildings on separate lots, claim for a lien filed against all within four months after completion of the work on the last one did not entitle the builder to a lien under the Illinois laws against the other buildings, which were completed more than that time before the filing, and had been sold. (Illinois Supreme Court, *Schmidt vs. Anderson*, 97 Northeastern Reporter, 291.) Provision in a building contract that the contractor would not permit any lien upon the building, did not prevent him from filing a lien for work and material furnished by him, where the owner broke his agreement to make monthly payments as the work progressed. (New York Court of Appeals, *Kertscher & Company vs. Green*, 99 Northeastern Reporter, 146.)

Authority of Architect

An architect employed to draw plans and specifications for a building and to supervise the construction has no implied authority to bind the owner by agreeing with the builder for a modification of the building contract. (California District Court of Appeals, *Brown vs. Coffee*, 121 Pacific Reporter, 309.) An architect was not made judge as to whether the work was completed according to specifications by provision in a building contract that the contractor should be paid when all the work should be accepted by the architect. (Texas Court of Civil Appeals, *Olsen vs. Burton*, 141 Southwestern Reporter, 549.) When the contract makes the supervising architect the sole arbiter of disputes between the builder and the owner his failure to object to matters concerning the work of which he has knowledge amounts to an approval which cannot be renounced to the prejudice of the builder. (Ore-

gon Supreme Court, *Pippy vs. Winslow*, 125 Pacific Reporter, 298.)

Where a building contract provided that the value of extra work should be computed by architects, and, if either party dissented, the matter should be determined by arbitration, and the agreement was not strictly observed, some alterations being ordered in writing and some orally, the owner, after taking possession of the building, could not defeat the contractor's claim for extra work because there had been no previous arbitration. (United States Circuit Court of Appeals, *Schmubach vs. Caldwell*, 196 Federal Reporter, 16.) Acceptance of the building by the owner implies a waiver of any claim for damages for non-performance, in the absence of fraud or mistake on the builder's part. (California District Court of Appeal, *Mannix vs. Wilson*, 123 Pacific Reporter, 981.) An owner's occupation of a newly completed building, through his tenants, did not waive his right to recover for breach of a contract to plaster the building in a workmanlike manner. (Missouri Court of Appeals, *Walter vs. Hughes*, 148 Southwestern Reporter, 148.)

If an owner wrongfully orders a builder to refrain from further performance of a contract, the latter is entitled to treat the contract as subsisting and sue under it at expiration of the time fixed for performance, or he may treat the contract as broken and at an end, and sue for consequent loss of profits. (Tennessee Supreme Court, *Brady vs. Oliver*, 147 Southwestern Reporter, 1135.) An owner was not entitled to claim a deduction against a general contractor, on account of defective plastering, where he refused to permit the plastering to be done according to the general contract and insisted on a separate contract for that work. (Michigan Supreme Court, *Scheible vs. Klenk*, 137 Northwestern Reporter, 106.)

If a builder furnishes work or materials of inferior character, but of some value to the owner, he is entitled to recover their reasonable value, less the damages sustained by the owner through failure to furnish the work or materials required by the contract. (Delaware Superior Court, *Hawthorne vs. Murray*, 84 Atlantic Reporter, 5.)

Under a contract specifying the exact construction desired, and containing a provision that floor should be "guaranteed and kept in repair for two years," the contractor was not bound to keep the floor watertight; the agreement merely amounting to a warranty that the work and materials would remain in good order and condition for the time specified. (Massachusetts Supreme Judicial Court, *Erickson vs. George B. Il. Macomber Company*, 97 Northeastern Reporter, 615.)

An agreement that on the builder's default the owner shall be entitled to dispossess him and complete the work himself, and that the architect's decision on any matter in dispute shall be final, does not authorize the architect to allow, at the expense of the contractor, the rental value of building from the date allowed by the contract after the completion thereof to the date of the actual completion; but it is within the architect's power to allow an item to the owner for the supervision of the completion of the building. (Pennsylvania Supreme Court, *Kann vs. Bennett*, 82 Atlantic Reporter, 1111.) An owner who takes pos-

session under such a contract, and uses the building without expending anything for its completion, is liable for an unpaid balance due on the contract price. (New York Supreme Court, Wakeham & Miller vs. Roman Catholic Church of St. Paul, 134 New York Supplement, 736.)

A construction company was liable to the employee of an independent contractor for injuries resulting from the company's negligence in failing to see that a scaffold altered by it for its own purposes, and afterward used by the contractor's employees, was not placed in as safe condition as before it was altered. (Washington Supreme Court, Bowen vs. Smyth, 123 Pacific Reporter, 1016.) Where two boys in the employ of a subcontractor working on a building threw missiles through the skylight in an adjoining building, the general contractor was not liable, though he took steps to prevent recurrence of the act; he not having had control of the boys. (New York Supreme Court, Cooper vs. Hedden Construction Company, 135 New York Supplement, 746.)

Minnesota State Association of Builders' Exchanges

At the eleventh annual meeting of the Minnesota State Association of Builders' Exchanges held in December in the quarters of the Minneapolis Builders' Exchange, President S. G. Tuthill opened the session by naming various committees, including those on Credentials and Resolutions.

In his annual address President Tuthill reported 601 members as against 584 the year previous, the increase coming from the growth of Exchanges in the larger cities. He referred to the good work of the Minnesota Employers' Association and expressed the desire that the "open shop" should be maintained.

Free employment bureaus were recommended to be established by Exchanges and others so as to afford workmen a free opportunity to secure employment without submitting to the restrictions of any organization, and have their efficiency and merits of record. He recommended as a solution of the differences between employer and employed that good and sufficient wages be paid all crafts.

An Interstate Association of Builders' Exchanges

He suggested for consideration the organization of an Interstate Association of Exchanges to include the neighboring states. He favored greater and better co-operation between architects and builders and believed that a general conference of architects and builders of the state could be effected to good advantage.

On the subject of industrial education he held that the state should co-operate to provide the same as all other educational costs. As Massachusetts has evening classes in industrial education for those employed in the day time, President Tuthill recommended that the same be created in Minnesota, and urged the continuance of a committee on industrial education.

After the report of the president had been referred to a committee, a communication was read calling attention to a practice which has grown up of architects charging for furnishing plans to contractors for figuring. This resulted in a most interesting discussion, and the settlement of the question was left to the executive committee.

The question of the place of holding the next annual meeting was also left with the executive committee with power to act.

Resolutions expressing the thanks of the association to President Tuthill for his annual address and for his work as president were adopted; also to the various committees for the time and work which they have

devoted to the matters submitted to them, and to the Minneapolis Builders' Exchange for its hospitality and courtesies. The officers for the ensuing year were as follows:

President.....S. G. Tuthill, Minneapolis.
First Vice-Pres......John A. Seeger, St. Paul.
Second Vice-Pres......Frank A. Carlson, Duluth.
Third Vice-Pres......O. H. Olsen, Stillwater.
Fourth Vice-Pres......W. S. Kingsley, Fairbault.
Fifth Vice-Pres......W. H. Jackson, White Bear.
Secretary-Treasurer..Eugene Young, Minneapolis.

The delegates listened to a very interesting talk by George M. Gillette of Minneapolis on the subject of a Workmen's Compensation Law. He told of the efforts of the Minnesota Employers' Association to frame a bill which should be fair to workmen and to the employer and which should, in eliminating present objections, avoid instituting new ones. He explained that the proposed Minnesota law followed the general plan of the New Jersey law, which is said to be working well, but which is just the opposite of the Wisconsin law. The theory of the plan is that a proper law will remove and prevent a large amount of litigation, reduce long-drawn-out jury trials, and use the present courts without creating new judicial machinery.

Meeting of Cleveland Sheet Metal Contractors

The annual meeting and banquet of the Sheet Metal Contractors' Association of Cleveland, Ohio, was held Friday evening, December 20. About seventy-five were present, including representatives of a number of jobbing concerns. The members were entertained with an address and story told by "Judge" George P. Earley of the American Sheet & Tin Plate Co., Pittsburgh. Newly elected officers were also called on to make remarks.

The banquet was served in the banquet hall of the Chamber of Commerce. After the conclusion of the speech making the members attended in a body the annual Christmas party given by the Builders' Exchange in the same building.

The officers elected for the ensuing year were as follows: President, H. B. McGrath; vice-president, F. C. Thornton; secretary, C. M. Harris; treasurer, F. M. Potter; directors, W. J. Birmingham, F. A. Walker, C. J. Korner and H. H. Lind.

Highest Brick Chimney in Canada

What is said to be the tallest radial brick chimney in the Dominion of Canada is located on Baptist's Island, Quebec. It is 250 ft. high and its purpose is to serve the large boiler plant of a paper mill. The inside diameter at the top is 10 ft., the outside diameter at the bottom 20 ft. 3 in. and the inside diameter at the bottom 14 ft. 5 in. The radial bricks of which the chimney is constructed are perforated vertically, the perforations forming dead air cells which tend to prevent rapid heating and cooling of the walls of the chimney while at the same time preventing rapid radiation. The perforations also lighten the entire structure and effect quite a saving in connection with the foundations.

The chimney is lined with special radial brick for 60 ft. which prevents the hot flue gases from coming in contact with the interior walls of the chimney proper. The first 30 ft. of the chimney is octagonal in shape and the balance of the height is round.

The plans which have been filed for the new Equitable Building on Broadway, New York City, call for a 37-story structure estimated to cost about \$8,000,000.

PLASTER AND PLASTER CORNICES

Some Comments on English Practice as Regards
Interior Cornices of Plaster

By JOHN Y. DUNLOP

PLASTER is the popular name for the ordinary covering of lime and sand as applied to walls. Technically the word "plaster" often signifies plaster of Paris. Ordinary plaster consists of slacked lime and sand.

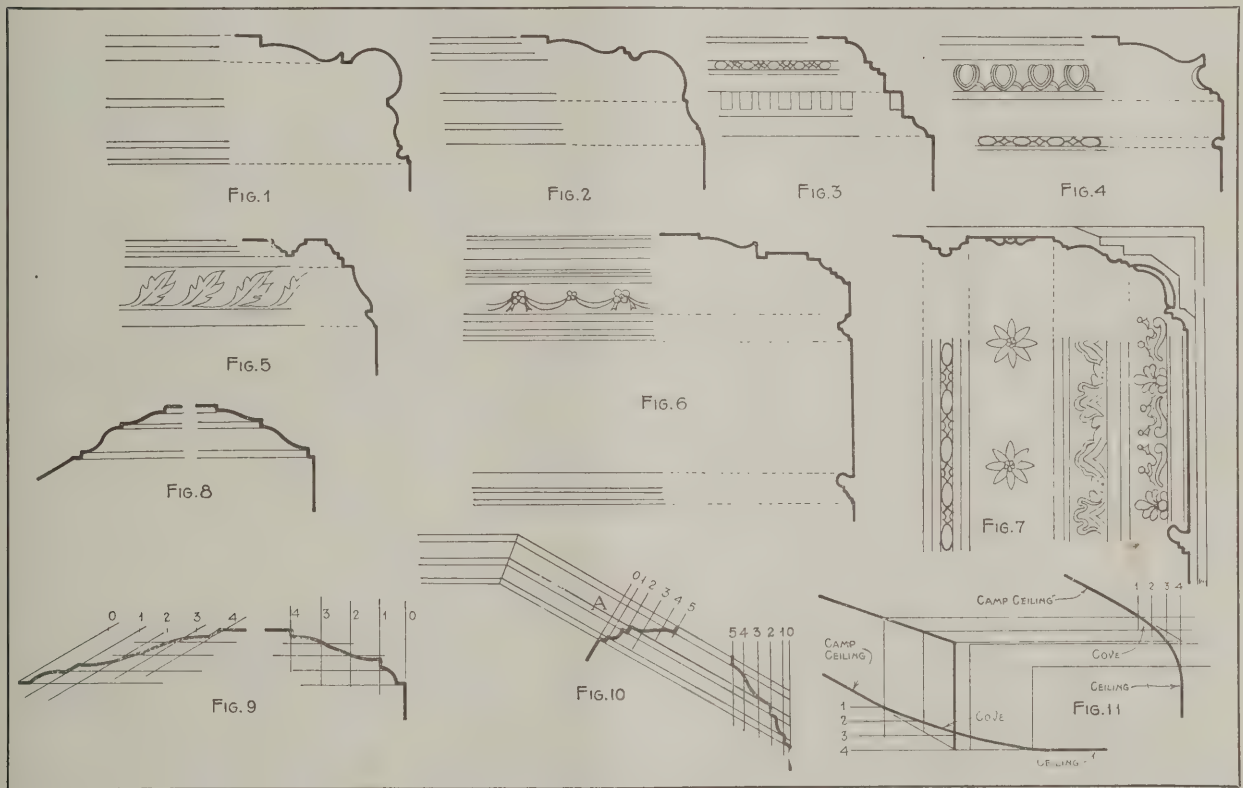
Two coat work consists of a first coat of coarse stuff; that is, slacked lime mixed with sand in the proportion of 1:3, a little cow hair being added to bind the mixture together. The plaster should be stiff enough to hold together and just soft enough to form a key on the prepared wall.

In a lathed wall it should be wrought well in between the lath with the point of the trowel and bulged out between the lath into excrescences which form a key and keep the plaster in position. The

key for the next coat the surface is scored with the points of a number of lath in deep scratches crossing each other diagonally into sets of parallel lines about 3 or 4 in. apart.

The second or floating coat is applied when the first coat is sufficiently dry to resist pressure. At this stage the wall is straightened from floor to ceiling and from end to end. It is done by forming in a true plane narrow bands or screeds of plaster 6 or 7 in. wide and at intervals of from about 4 to 10 ft. on the walls or ceilings. The surfaces are then brought into the required plane by passing long straight-edges over them.

Horizontal screeds for ceilings should be beveled and vertical screeds plumbed up from the floor level



Plaster and Plaster Cornices

surface is roughed over by scratching with a birch broom or with a scratching stick so as to form a key for the second coat.

The second coat or setting is a thin layer of putty or gauged stuff and should not be troweled on until the first layer is stiff. If the latter has become very dry it must be first moistened before the second coat is applied or the latter in shrinking will have its moisture sucked out, crack and fall off. As the fine stuff is laid on, the surface is smoothed by drawing backward and forward over it the wet brush used for dampening the first coat. This is one of the cheapest of plasters and is used in inferior work.

Three coat work insures a truer and better surface and consists of a first or rendering coat which is laid on as before described but in order to form a good

or skirting ground. The space between the screeds is then filled flush with the plaster and smoothed over with the straight edge, after which the surface is gone over with a small hand float and any defect made good by adding a little soft stuff.

Before applying the third coating or setting the floated surface should be scratched slightly by fixing a projecting nail on the hand float and polishing over.

The mixture for the setting coat varies according to the nature of the finish required. If the surface is to be papered it should be set with fine stuff and if the wall is to be tinted it should be of plasterer's putty mixed with a little fine sand.

If the surface is required to set quickly, especially in damp weather, from 1/6 to 1/3 plaster of Paris should be added to the stuff, which should be gauged

or mixed in small quantities. The last coat is finished with a wooden float or steel trowel, the latter giving the smoother surface.

Backing Required on Ceilings and Wood Partitions

On ceilings and wood partitions it is necessary to provide a backing to which the plaster will adhere. This is usually formed with laths of oak or fir about 1 in. wide and nailed to the studs or ceiling joist about $\frac{1}{4}$ of an inch apart. Single lath are about $\frac{3}{16}$ in. thick, lath and a half are $\frac{1}{4}$ of an inch thick, and double lath are $\frac{3}{8}$ of an inch thick.

More fire-resisting substances are now to be obtained in metal lathing which have all been severely tested in actual fires.

Ordinary plaster is undoubtedly porous and absorbs both moisture and organic matter and in the case of hospitals is liable to be contaminated by impurities given off by the lungs of patients which may prove a source of discomfort and ill-health.

A harder and more impervious wall covering may be obtained by using either Portland cement or one of the so-called cements having plaster of Paris for a base. These have the further advantage that they set at once and can be painted in a very short time after being finished, whereas ordinary plaster frequently takes weeks to harden and cannot be satisfactorily painted for a long time.

Fibrous plaster has a plaster face on a canvas backing and can be obtained in plain slabs of various sizes which are simply fixed to the wood studs or ceiling joists by screw nails. A thin coat of plaster of Paris is then applied to the whole, covering the joints and rendering the surface uniform. A great saving of time is thus effected by the use of fibrous plaster slabs and a house can be safely occupied much sooner than when ordinary plaster or even cement is used.

Ornamental fibrous slabs are now made in endless variety and can be fixed to form the ceiling frieze or cornice of important rooms of a building.

Plaster molding and enrichments are often receptive and therefore difficult to clean but undoubtedly a great change for the better is now taking place. The days of deep hollows in cornices and bold enrichments are numbered and taste has reverted to a more refined detail of a century or two ago.

Various Styles of Cornices

A simple but effective cornice without any dirt-catching members is obtained by the elaboration of the surfaces of the plaster. Figs. 1 and 2 of the accompanying sketches represent simple cornices with no enrichments. Fig. 3, however, shows a classic cornice with dentil blocks and bead and reel enrichment.

In Fig. 4 is presented a cornice with egg and tongue enrichment suitable for a dining room. Figs. 5 and 6 have plaster enrichment applied, which is from stock patterns obtained from the usual makers, although they are sometimes specially molded.

In Fig. 7 is shown a fine design of cornice for a dining room, with elaborate enrichment and frieze, the lower part being formed with the picture molding.

Cornices should be as high in design as possible in order to give the desired effects, and if their greatest projection is not more than 2 in. a backing of coarse stuff will be sufficient to support them. If, however, the projection is 6 in. or more brackets of wood roughly cut to the section of the cornice as indicated in Fig. 7 should be fixed along the wall at intervals of 12 in. Upon these lath are nailed and covered with a thick coat of coarse stuff so that a rough edition of the future cornice is produced.

A mold made of zinc fixed on to wood is then for the time muffled by covering the profile edge with a layer of plaster of Paris about $\frac{1}{8}$ in. thick. The mold

is then drawn along over the surface of the rough cornice of coarse stuff already formed. It is guided by battens fixed on the ceiling and wall, and the effect produced by sliding the mold along is to remove the surplus stuff and leave the cornice molded approximately to the form required. The surface all over is about $\frac{1}{8}$ of an inch within the intended profile. The muffling is now removed from the mold and the surface of the cornice covered with gauged stuff, over which the mold is worked until the exact form of the cornice is obtained.

The miters in the angles, as well as all small breaks, are finished by hand and the indentations which have to be left for the enrichment of plaster of Paris are cemented into place.

The size of a cornice should be regulated by the height and width of the room and in expensive mansions it is always advisable to run a trial length to judge of the effects produced.

Some of the Difficulties Experienced

In running cornices in the attic with camp ceilings difficulties are sometimes experienced in getting the cornice to run right around the room. Fig. 9 shows a section of the cornice on a ceiling and camp ceiling. Both sections are alike, but this, however, cannot always be carried out. Fig. 9 shows a cornice in which a special mold is made for the sloping ceiling. To obtain the raking mold divide the projection of the ordinary cornice into any number of parts; set off the same distances from the sloping ceiling and take a horizontal line across which will determine the points in the new profile. In Fig. 10 is shown a cornice for an apartment similar to that last referred to, only here the level cornice is run at the lower edge of the camp ceiling, with the result that a cornice is required on the rake from the wall to the ceiling. The raking molding is shown at "A," and the molding on the ceiling is of the same section as "A."

In Fig. 11 is shown the sections of the cove which is formed at the junction of the ceiling and camp ceiling. In this example the camp ceiling of the side is at 30 degrees and the end at 60 degrees to the horizontal. The principles involved in working out the sections are clearly shown and do not call for special comment.

A Large Reinforced Concrete Building

The Larkin Company has placed a contract with the Aberthaw Construction Company, Boston, Mass., for the building of a half-million dollar storage and manufacturing building on the Larkin Company's property at the corner of Arch and 23d Streets, Philadelphia, Pa.

The building will be twelve stories high, ranking among the high reinforced concrete structures of the country. The construction will be reinforced concrete throughout, the floors carried for part of the way on structural steel columns. Work on this building is to begin in the early spring.

For the purpose of financing the largest office building in the world the DuPont Company of Manhattan, N. Y., was recently incorporated at Albany with a capital of \$12,000,000. The new building, known as the "Equitable," will cost with its site about \$29,000,000; it will be 37 stories in height and is expected to be completed by the first of May, 1914. The statement is made that the floor area will be equal to the Woolworth, the American Express and the Municipal buildings put together. The incorporators of the new company include among others Gen. T. Coleman du Pont, president, of Wilmington, Del.; Frank M. Andrews, the architect, vice-president, and L. L. Dunham, secretary and treasurer.

New Publications

Saw Filing and Management of Saws.—By Robert Grimshaw; 134 pages. Size $4\frac{1}{4} \times 6\frac{1}{2}$ in. Profusely illustrated. Bound in cloth covers. Published by the Norman W. Henley Publishing Co. Price \$1.00 post-paid.

This well-known work by a veteran author is in its third edition, which has been revised and enlarged in order to bring it strictly up-to-date and include the latest ideas and developments of modern methods. The work consists of a practical treatise on filing, gumming, swaging, hammering and brazing of band saws; speed, power and work to operate circular saws, with full directions for filing, setting, polishing and straightening hand, butchers', band and circular saws. Valuable suggestions are presented as to the files to use, hints for repairing and caring for saws, home made sets and clamps, emergency repairs, etc. Not the least interesting feature of the work is found in the tables of proper shape, pitch and set of saw teeth, as well as sizes and number of teeth of various saws.

Smoley's Parallel Tables of Logarithms and Squares.—By Constantine Smoley; 503 pages. Size $4\frac{1}{2} \times 7$ in. Bound in flexible covers with gilt side and back titles. Published by the McGraw-Hill Book Company. Price \$3.50.

This is the seventh edition, revised and enlarged, and is intended for the use of architects, engineers and students. In this edition a special device has been added for solving right triangles of comparatively small dimensions. This is a diagram that will enable the user with a little practice to obtain almost at a glance results which are accurate enough for all ordinary purposes. Where the results obtained from the diagram are not considered sufficiently accurate, or analytic solutions are preferred, a general check on the results obtained can be secured by using the diagram. Supplementing the latter is a table giving in parallel columns the logarithms and squares of numbers varying by sixty-fourths from zero to 16 in. In other respects the book is the same as the previous edition.

Report of Tests of Building Partitions

Interesting data of value to members of the building trades is contained in a neatly printed 80-page pamphlet embodying the report of tests of partitions by fire and water made in Cleveland, Ohio, June 28 and 29, 1912, under the direction of Virgil D. Allen, city inspector of buildings. The tests were conducted at the laboratories of the Associated Metal Lath Manufacturers by a committee consisting of Prof. John H. Nelson of Case School of Applied Science, L. H. Miller, engineer the Bethlehem Steel Company, Cleveland, and William S. Lougee, architect, Cleveland. The tests were made on six panels and included metal lath on wood studding, wood lathe on wood studding, 2 in. solid metal lath and metal studding, stucco wall of metal lath on wood studding according to typical specifications of the Associated Metal Lath Manufacturers, 4 in. hollow metal lath on metal studding and plaster board on wooden studding.

A report of the results of these tests was made in the *Building Age* at the time. The committee's report goes into the subject very completely and contains a large amount of detailed information. The pamphlet contains half-tone illustrations from photographs showing the panels after the tests, and reproductions of drawings showing finished partitions, time temperature curves and defection diagrams. The committee drew no conclusions from these tests, stating that it had endeav-

ored to place every obtainable detail in its report in such form that their interrelated significance would enable the reader to arrive at his own conclusions.

Competition for the National Palace at Port-Au-Prince, Haiti

A competition for the building of the National Palace at Port-au-Prince, Haiti, with all its outbuildings to replace the former palace which was burned August 8, 1912, is open to Haitien and foreign architects and engineers. The Congress of Haiti has appropriated \$100,000 for the construction of this new palace, which is to be fireproof and thoroughly modern in every detail.

The series of prices will be given for the best plans, the first prize being \$500, the second prize \$250, and the third prize \$200.

American architects and others desiring to compete are required to send their plans before February 4, 1913, to the Department of Public Works (Département des Travaux Publics), Port-au-Prince, Haiti. Full information regarding the extent of ground the buildings are to cover, the character of the rooms required for the palace, description of outbuildings, as well as the scale to which the plans should be drawn, will be furnished upon application to the office of the Pan American Union, Washington, D. C.

Boston Builders Hold "Open House"

The Master Builders' Association of Boston held their third annual "Open House" on Wednesday, December 18, 1912, following the annual meeting. The occasion was still more of a rousing success than heretofore.

As usual a "stand-up lunch" of substantial nature was served at one end of the Exchange rooms. Promptly at 12:30 p. m. the orchestra of eight pieces struck up, and the advancing hordes were "through the line" and at the eatables without visible delay.

Afterward there was jollity, good fellowship, and the hearty singing of songs from the "Master Builders' Song Sheet" which was "on sale" bearing the notice, "Price, One Smile" at the top, accompanied by the old saw:

"Smile and the world smiles with you,
Frown and you frown alone."

The rooms were crowded to their fullest capacity. The affair was for members and their friends, and is yearly proving its great popularity and its value as one means of adding the necessary dash of social good-will to the cup of business care.

Williamson Free School of Mechanical Trades, Williamson School P. O., Delaware County, Pa., in Bulletin No. 10, just issued, outlines in detail its course in carpentry. The course includes a series of shop talks covering the tools used in carpentry; the various parts of which a building is composed, the hardware used therein and the machines used in the carpenter shop. There are also talks on the construction and fitting of building trim and upon building construction in general. There are exercises in general jobbing, also talks dealing with the cost of construction, and comparison of student's estimate with actual cost of a job and discussion of the work. A graded list is used in the carpentry department, this serving the double purpose of keeping a certain class of work necessary at the school constantly moving, at the same time assuring to the apprentice instruction in all branches of the trade. The course covers a period of three years, the details of which are set forth at length.

WHAT BUILDERS ARE DOING

Bird's-Eye View of Building Situation in Leading Cities—Estimated Value of the Projected Improvements



RECORDS in the office of Superintendent of Buildings John Fulton show that Albany, N. Y., enjoyed a veritable building boom during the year just ended. During this time there were more than 2725 permits, representing an expenditure of \$4,510,304, while in the twelve months of 1911 there were 2443 permits issued, representing an estimated expenditure of \$2,791,626.

From the statistics it will be seen that although the number of permits granted for new buildings in 1911 was somewhat less than in 1912, the estimated cost of new buildings last year was greater by almost two millions of dollars. An interesting comment on the increase in the use of automobiles is shown in the application for permits to build garages. In 1911 there were 18 permits granted for buildings of this character and last year there were 34. The increase in expenditure for garages was \$132,325.

Architects and contractors are already looking forward to an even larger volume of operations this year than was the case last and the belief is general that 1913 will be good for the construction of heavy brick buildings.

Atlanta, Ga.

The year which has just closed has been an active one in the building line in the city, and the figures compiled in the office of the Bureau of Building Inspection show that improvements aggregating a valuation of \$9,975,334 had been issued against a total of \$6,215,000 for 1911. On the next to the last day of the year the permit for the Winecoff Hotel was issued estimated to cost \$300,000 and one for the erection of three crematory buildings at a cost of \$776,000.

Announcements have already been made of plans for several important buildings in the near future, so that the new year starts out with bright prospects. The feeling prevails that the current year will show even greater activity in the building line than was the case in 1912.

Asheville, N. C.

As compared with the volume of building operations in other cities the record for Asheville may not appear significant, yet the year just closed has been one of the most remarkable ever experienced in this city as regards building operations. There has been a veritable "boom" in the erection of business buildings and private dwellings and permits were issued for work within the city limits to the amount of \$420,287. Outside the corporate limits of the city, but really in the suburbs, building operations have been carried out on a fairly elaborate scale. One of the most prominent operations was the Langren Hotel, completed about the first of June, and costing approximately \$400,000.

The outlook for 1913 is regarded as even brighter than was the case at the beginning of the year just closed. Construction work will soon begin on a \$40,000 Masonic Temple and it is expected that a new inn will be built by the Kenilworth Company on the site of the old one at a cost of about a quarter of a million dollars.

Baltimore, Md.

The figures covering building operations for the year make a most gratifying showing when compared with those for 1911. According to the report of Inspector of Buildings Clarence E. Stubbs the estimated cost of new work for which permits were taken out was \$8,319,145, adding to this the cost of alterations, etc., brings the total to \$10,385,892, which is something like \$1,000,000 more

than the total value of the building operations for 1911.

Adding 20 per cent. for under valuation at the time the permits were taken out brings the total to \$12,463,070.40. To this in turn may be added the permits for elevators, electric installation and motive power, heating apparatus, gas fittings, alarm gong, and minor privileges, giving a grand total of \$14,479,373.90.

During the past year 2154 two-story brick dwellings were planned costing \$3,404,929. There were also 124 two-story frame dwellings costing \$535,850 and 104 factories and warehouses involving an outlay of \$1,706,549. Other important items include 10 apartment houses costing \$615,000 and four office buildings costing \$555,000.

Birmingham, Ala.

The annual report of Buildings Inspector W. O. Matthews shows 1912 to have been the most successful in building activities in the history of Birmingham. There were 3412 permits issued calling for a total estimated expenditure of \$3,813,079, as against \$3,554,157 in 1911.

In his report Building Inspector Matthews states that while 1912 was a record breaker he looks for a still greater volume of operations in 1913, as he can already see permits aggregating an estimated cost of \$4,500,000 in the next three months. This is due to the fact that there is just now several million dollars worth of building being projected but for which permits have not yet been issued. The year is expected to be the most active in the building line that Birmingham has ever witnessed.

The Builders and Traders Exchange of the city issues weekly a poster announcement briefly covering matters of interest relating to the organization and members thereof. The "New Year's Special," issued Wednesday, January 1, carried a list of plans in the estimating room; the phraseology of two amendments to the constitution and by-laws to be considered at the annual meeting, January 13; a list of names on the two tickets put out by the nominating committees; the names of new members elected at the meeting December 30, and names of concerns which have made application for membership. The announcement concludes by wishing all "a Happy and Prosperous New Year."

The annual election of the Builders Exchange was held on January 13, at which time an amendment to Article I of the Constitution was adopted, changing the name of the organization from the "Builders and Traders Exchange" to the Builders Exchange of Birmingham, Ala. The treasurer's report showed the organization had been operated on a broad and liberal scale and that after paying all expenses there was a comfortable surplus in the treasury. The secretary's report showed that the membership had been increased by 70 during the year and that it had lost 24 members.

The result of the balloting for officers for the ensuing year was as follows:

President L. L. Stephenson
First Vice-President..... W. T. Estes
Second Vice-President..... R. I. Ingalls
Treasurer..... J. H. Eddy
Secretary..... G. T. Stafford

There were five directors elected and two executive committeemen.

Retiring President John W. Sibley made a stirring address to the members, pointing out the high standing and reputation of the Exchange and stating that the watchword of its motto, "Co-operation," should ever be borne in mind, for it is only by faithful adherence to this that the Exchange can maintain its existence and keep step with the march of progress and prosperity. He referred to the efforts of the Exchange to bring about cordial and co-operative relations with the architects of the city and "harmonious and scientific compliance with the requirements of the city building laws."

Buffalo, N. Y.

Building operations for 1912 totaled \$12,992,000, a gain of 25 per cent. as compared with 1911—making the year the

largest in building construction in the history of the city and one of remarkable growth in all branches of construction development—industrial, commercial, residential and in public and municipal building.

Along industrial lines, particularly, the city has shown wonderful progress and growth during the twelve months just closed. More than 30 industrial concerns have built new plants or factories during 1912, representing an investment of considerably over \$1,000,000 and an amount fully equal, or greater, has been expended in additions to existing plants and factories. These plant extensions number between fifty and sixty and will add very largely to the city's output of manufactured products.

The number of permits issued by the Bureau of Building for the month of December was only 183, with a valuation of \$359,000. As compared with December, 1911, this was a pronounced decrease but is accounted for by unfavorable weather conditions for building prevailing during the latter part of the month and also by the fact that permits for December, 1911, included a large, high cost office building and several other expensive structures.

Among the permits issued in the last month of 1911 are included a store and loft building, for John G. Wicker; a cold storage building and bakery, for the New York State Hospital, at Forest and Elmwood avenues; a warehouse, for the Buffalo Co-Operative Stove Company; storage building and office, for the Iroquois Roofing Company; a four-story addition to the plant of the Buffalo Cereal Company; also extensive alterations and additions to seven-story warehouse for the Dwelle-Kaiser Company and additions to the plants of the Larkin Company and the Niagara Machine and Tool Works.

Canton, Ohio.

The building record of the year just closed did not quite reach that of 1911. The number of permits issued during 1911 was 729, with a valuation of \$1,635,120, whereas, during 1912, 643 permits were granted with a valuation of \$1,482,718, showing a decrease of 86 permits and a decrease in the valuation of \$152,402.

Part of this apparent decrease may be attributed to the fact that owners of new buildings to be erected have been lax in taking out permits and also to the fact that the valuation given has not always been the true one. The writer has in mind one particular case where the building contract called for an expenditure of \$13,000 and the valuation given the City Clerk on this building was \$5,000.

Another reason is that many owners do not take out a permit at all. It is to be hoped that our City Fathers will make an effort to secure the adoption of the new Building Code at an early date, which will overcome any tendency to build without a permit.

The tendency during the past year has been toward better buildings, both in construction and design. We are getting away to some extent from the old store box shapes and getting more individuality in our residences and business buildings; for instance, the C. W. Keplinger home, the residence of E. W. Gibbs, Chas. F. Dick, David B. Smith, Dr. H. M. Schuffell and others.

The larger churches are taking a step forward in the erection of new houses of worship, as the First Baptist, Trinity Reformed, First Presbyterian, First Christian and others. The builders of the city are glad to see this advance movement but deplore the fact that so much of the larger work is being designed by architects and built by contractors who are not residents of this city. The Builders' Exchange believes in a greater Canton, believes that our Canton architects and Canton builders are just as capable as any outside of the city and that they ought to be given the preference.

The outlook for spring building is promising. The new Pennsylvania depot, Phillips Bible Institute and the Renkert office building at North Market and Fourth streets are assured.

Considerable preliminary planning is being done by local architects, the contractors are busy with prospective customers and the indications are that the building activity in 1913 will far exceed that of the year just closed.

With the adoption of the new Building Code, which, we are informed, is nearly ready for presentation to the Council, Canton ought to make a creditable showing this year and take a great step in advance for a "better built Canton."

Cedar Rapids, Ia.

There have been only two years in the history of the city when the activity in the building line was greater than during the year just closed. During those two years the total sum was brought to an unusual amount through the construction of several large factory buildings.

The estimated cost of the buildings projected last year was \$2,201,050, while for the 12 months of 1911 the total was \$2,000,350. These figures compare with \$2,618,050 in 1910 and \$2,434,750 in 1909.

By far the greater amount of building last year was in the construction of residences, some of which cost as high as \$25,000. A number of business structures and factories were also erected, one of the more important being the new building of the Killian Company, to cost \$150,000.

It is now expected that the ensuing year will eclipse any previous one in the city's history in the way of new buildings, as there are already several important structures that will be completed before it is closed.

Chicago, Ill.

The record of building activity last year shows a material falling off in the total cost of the permits issued when compared with the figures for 1911. An analysis of the figures given below shows that outside of the central district not only was there a larger volume of building than during the preceding year, but also, if the figures for August of the two years are eliminated, the cost figures for 1912 exceed those of the previous year by over \$500,000.

The decrease of over \$17,000,000 in the cost of the permits issued was, of course, due to the falling off of the number of permits for building in the downtown district. This came about as a result of the abnormal activity in August, 1911, when an ordinance was passed limiting the height of buildings to 200 ft. As the old ordinance allowed structures to be erected to a height of 260 ft. there was a rush to take advantage of the old law until the new one went into effect. Permits were taken out for buildings in



View in State Street, Chicago, Showing New Buildings

the business district, to cost nearly \$22,000,000, the month closing with \$26,260,000 to its credit. The following is the statement for 1912:

	Permits.	Feet Frontage.	Cost.
January	322	8,808	\$1,999,300
February	445	12,332	3,771,100
March	672	18,531	4,743,600
April	1,416	37,924	9,345,400
May	1,222	34,472	10,373,200
June	1,271	35,441	10,653,900
July	1,202	34,651	10,265,800
August	1,103	31,903	8,436,100
September	969	28,447	7,210,900
October	1,178	34,080	8,745,600
November	851	27,298	7,625,000
December	559	18,587	5,028,600
	11,210	322,474	\$88,198,500

A general review of building in Chicago during the last 5 years is shown in the following table:

	Permits.	Feet Frontage.	Cost.
1908	10,771	291,655	\$68,204,080
1909	11,241	310,351	90,509,580
1910	11,409	327,250	96,932,700
1911	11,203	305,326	105,489,600
1912	11,210	322,474	88,198,500

The largest permit last year was that for the 12-story Westminster building, costing about \$750,000. The largest for 1911 was that issued to the builders of the Continental and Commercial Bank building, to cost \$4,500,000.

One of the interesting features of Chicago building has been the enormous amount of flat construction, which has far exceeded that of any previous year. The figures for 1911 were less than 1910 and still less than 1912. Comparison shows an increase for 1912 of over \$7,500,000.

The development of the suburbs goes on apace. Oak Park now has an imposing state bank of recent construction. Operations have been commenced on a new theater, to cost about \$100,000, and the latest addition is the new steel and brick building, partially completed, of the Rogers & Nicholas Hardware Co.

River Forest's latest addition is a group of brick stores and offices, the chief of which is the River Forest State Bank. Steady improvements have been noted in the suburbs of Forest Park, Evanston, La Grange and others close by.

There is more money being spent on buildings and improvements in the "loop" district than ever before. The development of State street has consumed the most of the expenditure and many new structures will catch the eye of visitors familiar with Chicago. The new State and Quincy building, 21 stories in height, is the latest addition; the Lytton building, 18 stories, is rapidly nearing completion; the North American building; the new addition to Rothschild & Company's department store; the renovation and increased height of the Boston Store, together with Mandel Brothers' store, constitute notable features. A view in State street is shown in the accompanying picture.

The latest innovation of Marshall Field & Co. is the announcement of the erection of a 20-story structure, on which operations have already been commenced. This will adjoin the department store and the exterior finish will be made to resemble that of the store. One of the largest hippodromes in the world will be put up in the business district on State street commencing May 1 and is to cost approximately \$500,000. The feature of this theater will be the absence of post obstruction in the auditorium. Seating capacity is to be 3000.

The cornerstone of the new college of the Teachers' College of the Evangelical Lutheran Synod of Illinois, Ohio and other States was laid recently. The college will cost \$250,000 to erect and will be modern in every respect. The buildings will be five in number and will be all connected by corridors. The architecture will be of the classic Doric style. In addition there will be nine residences erected.

The Chicago White Lead & Oil Company has been granted a permit for the erection of a five-story addition to their factory. The dimensions will be 80 x 172 ft. and will cost \$100,000.

The annual meeting of the Chicago Masons' and Builders' Association took place at the Chicago Opera House on January 8. There was an attendance during the day estimated from 150 to 200. Arrangements were carried out harmoniously, much to the gratification of Secretary Klippel, who states that the association has passed through an excellent year of work and the organization is in a splendid condition. In a discussion concerning prospects for 1913 Secretary Klippel thinks they are the best he has seen during the past twenty years.

The voting on the selection of a president, vice-president and secretary ran very close, the returns showing the following results:

President.....C. F. Holman.
Vice-President.....F. Bulley.
Secretary.....Fred Klippel.
Treasurer.....Robert Mole.

An arbitration committee was appointed consisting of J. W. Kinnare and J. Neunkirchen.

Cleveland, Ohio.

Building operations in this city during 1912 broke all previous records. The year 1911 was a very active one in building lines, and until the figures of the building inspector's office were computed for December it was not certain whether the permits issued during the year would reach in amount as much as during the preceding year. However, during December a sufficient number of permits were issued to bring the amount for the year considerably ahead of 1911, the amount being materially aided by a permit for the superstructure of the new City Hall.

During 1912 there were 8790 permits issued for new buildings to cost \$18,180,078, and in 1911 there were 7860 permits issued for buildings to cost \$16,994,677.

Permits for the year include 2051 for frame buildings, 738 for brick and stone buildings and 6001 for additions and alterations.

During December there were 484 permits issued for buildings to cost \$2,517,430, and in December, 1911, there were 412 permits issued for buildings to cost \$2,330,800.

The general outlook in building trades for 1913 is very promising. A large amount of new work is in prospect and builders expect that during the year the record established in 1912 will be exceeded.

The cost of building increased considerably during 1912. Prices on lumber at present are from 10 to 25 per cent. higher than a year ago. Prices on yellow pine are about 25 per cent. higher. The advance on white pine and hemlock has been about 10 per cent and the same on brick and

cement. Other prices show little change as compared with a year ago.

The cost of building during 1913 will be increased somewhat by higher wages paid to carpenters. During 1912 the carpenters' wage scale was 45 cents an hour. An advance to 50 cents an hour has recently been granted.

The Contracting Painters' Association held their annual banquet in December at the Gillsy Hotel, when nearly 100 guests were present. Addresses were made by President Rutherford and Secretary Roberts of the Builders' Exchange and also by Secretary Hobday of the Employers' Association. Conrad Krause was re-elected president of the Association and H. W. Kemmerling vice-president. The Association re-elected Will S. Scobie secretary for a fourth term.

Cincinnati, Ohio.

The December report of the Building Commissioner shows only \$257,250 for estimated improvements, as compared with \$694,360 for the corresponding month of 1911. However, two large buildings ran the total for December, 1911, somewhat above normal. November, 1912, showed up with \$526,145.

The total number of permits taken out during 1912 is 11,751, with an estimated valuation for improvements of \$8,962,209. The previous year's record was \$13,383,000, but included in that year's estimates were the Union Central, City Hospital and several other large buildings. The first named was entered at \$2,000,000, hence there is no doubt but what there was a larger amount of small building construction during 1912 than in the previous year.

The following table gives the building record for Cincinnati as far back as 1888, and, as will be noted, 1898 was the most unsatisfactory year in the period named.

TOTAL ESTIMATED COST OF STRUCTURES.

1888	\$4,098,308	1900	\$2,145,035
1889	4,143,214	1901	3,505,450
1890	4,310,701	1902	4,669,585
1891	5,068,538	1903	4,502,255
1892	4,229,809	1904	6,325,330
1893	3,673,939	1905	9,709,450
1894	3,131,980	1906	7,101,866
1895	3,049,744	1907	7,737,062
1896	2,864,953	1908	6,428,988
1897	2,486,900	1909	7,806,369
1898	1,873,070	1910	8,052,915
1899	2,650,879	1911	13,383,000

No very serious labor troubles occurred in 1912, although the plumbers' and steamfitters' disagreement held up work on a number of buildings.

The outlook for 1913 is excellent, especially in so far as suburban residence construction is concerned. There are also a number of large buildings under way, or contemplated, included in which is the new Gibson House that will cost close to \$800,000. Several large school buildings will also be constructed, and if nothing unforeseen turns up the present year will be a very busy one for builders.

Dayton, Ohio.

During 1912 a total of 918 permits were issued, contemplating the expenditure of \$3,686,541. To this must be added the cost of the new post office building, about \$500,000, and two Carnegie libraries erected by the city at an approximate cost of \$50,000, making an estimated total for improvements of \$4,236,541.

Predictions in the first part of 1912 were not favorable for a continuance of the building activity that characterized 1911, but if anything there was an improvement over the previous year, although it was not until October, 1911, that applicants for building permits were compelled to register the estimated cost for contemplated new buildings or extensions.

There is an excellent outlook for 1913, especially in the factory construction line, as well as a number of school and other public buildings contemplated. Residence construction in the suburbs is proportionately slightly better than in the city proper, although there will be considerable work of this kind later on.

Detroit, Mich.

At the recent annual meeting of the Builders and Traders Exchange, which was largely attended and which proved to be a most interesting gathering of the members, the following officers were elected for 1913:

President.....George H. Clippert.
Vice-President.....George D. Nutt.
Treasurer.....W. Scott Hobbs.
Secretary.....Charles A. Bowen.

The report of the secretary showed that during the year 25 meetings of the Board of Directors were held, at all of which some particularly important subject aside from the routine work was considered. The Executive Board of Building Trades Employers was instrumental in having

introduced for contractors' use books of blanks on which orders for extra work were to be given with a view to overcoming disputes for this kind of work. The books have been largely used by local contractors and others.

The report of the secretary showed the membership on the first of January of the present year to be 350, which is a net gain of 30 during the year. The average daily attendance of members was 141 and the daily average number of visitors 42.

Retiring President W. R. Kales made a very interesting and comprehensive address in which he touched upon many topics of importance to builders and to the Exchange as an organization.

Dover, N. J.

The Master Builders Association held its annual meeting in December and elected the following officers for the ensuing year:

President.....A. L. Shoemaker
Vice-President.....Leonard Elliott
Corresponding Secretary.....Nelson Buck
Financial Secretary.....Albin Thorson
Treasurer.....J. T. Kerr
Sergeant-at-arms.....Edward Lynch
Business Agent.....Arthur Drake
Trustee.....Richard P. Ward.

Duluth, Minn.

The annual meeting of the Builders Exchange was a most interesting affair and a large number of members were present. The officers elected for the ensuing year were as follows:

President.....Frank A. Carlson
First Vice-President.....M. A. Thomson
Second Vice-President.....L. J. Klippen
Treasurer.....Thomas Thorburn
Sergeant-at-arms.....Thomas Quigley

Among the business transacted at this meeting was the appointment of a committee to assist the Rotary Club in boosting Duluth as one of the cities to be visited by the Perry Centennial pageant next summer.

Elizabeth, N. J.

The report of Inspector E. A. Brennan, covering building operations for 1912, shows 550 permits to have been issued for building improvements estimated to cost \$1,820,052.55, as against 526 permits for construction work costing \$2,155,587.65 in the 12 months of 1911. The discrepancy is due to the fact that during 1911 many factories, schoolhouses and other public buildings were erected. Last year, however, the number of dwelling houses built exceeded those of 1911 by a large margin, but the cost of the large factories, etc., brought the total for 1911 above that of last year.

Fargo, N. D.

The annual meeting of the Builders and Trades Exchange was recently held in this city when officers for the ensuing year were elected as follows:

President.....Harry T. Alsop
First Vice-President.....Emil Anderson
Second Vice-President.....Henry Boerth
Secretary.....Victor Leeb
Treasurer.....Thomas Sykes.

The reports of the secretary and treasurer showed the Exchange to be in a flourishing condition and a vote of thanks was extended to the retiring president and also to the secretary for the manner in which they had discharged the duties of their respective offices.

Fort Wayne, Ind.

This city set a new mark for itself in the record of building operations in the year just closed, and it has the distinction of exceeding the total for 12 months ever before reached by a second class city in this State. The number of permits issued was 830, calling for an estimated expenditure of \$2,885,215, while in 1911 there were 760 permits issued for building operations costing \$1,908,020.

The most active months were naturally April, May and June, these being far ahead of any others as regards the number of permits issued. What tended to greatly increase the total for the year was the permit for the new Pennsylvania Railroad Station, to cost \$125,000. Despite this, however, the year would have exceeded any previous 12 months, as the number of smaller buildings was far greater than in 1911.

The figures for December showed 41 permits to have been issued for work costing \$328,350, while in December, 1911, there were 30 permits issued, but the amount involved was only \$57,350.

Harrisburg, Pa.

The amount of building construction projected and executed in this city during the 12 months of the year just closed was somewhat less than that for 1911, but was a trifle more than the volume of operations for 1910. The figures show that last year there were 317 permits issued for building construction calling for an outlay of \$1,167,125, while in the 12 months of 1911 the value of operations was \$1,249,075. The most active month was May and the month of least activity was January.

Jacksonville, Fla.

According to the records compiled in the office of the Building Commissioner permits were issued during the year just closed for 1148 buildings having a total valuation of \$3,807,957, these figures comparing with 1343 permits for construction work valued at \$3,590,805 in the 12 months of 1911. Last year permits were issued for 977 frame buildings valued at \$1,629,350 and for 171 brick and stone buildings valued at \$2,178,607.

In 1911 there were issued permits for 1222 frame buildings valued at \$1,835,305 and 121 brick and stone buildings valued at \$1,755,500.

The records show that since the great fire of May 3, 1901, there have been erected in the city 13,059 structures of all kinds valued at \$35,896,898.

Notwithstanding the great activity in building circles the demand for private dwellings and business buildings is in excess of the supply. People from all over the country are being attracted to Florida as a place of residence, while the growth and prosperity of the business interests are causing expansion in all quarters.

Los Angeles, Cal.

December building operations have been but little affected by the holiday season and were on a much larger scale than a year ago. The total of building permits amounted to \$2,270,680, compared with \$2,597,723 for November, and \$1,421,875 for the same period of 1911. New contracts are coming out at a lively rate and no further decrease is expected this month.

The record for the year as a whole is most gratifying, showing the greatest gain ever made by this city in any similar period. The year's total is \$31,367,995, compared with \$23,004,185 for 1911 and \$21,684,100 for 1910, making an increase of nearly \$10,000,000 in two years. In only one month of 1912 was the total below \$2,000,000, while three months each exceeded \$3,000,000 and June and July surpassed all former records. The year has brought a rapid increase in home building, but even more notable is the building up of the business district with large permanent structures.

The principal building to be figured shortly is a 10-story concrete loft building, on either beam and girder or mushroom system, Austin & Pennell, architects. The MacGibbon-Frery Company is getting out plans for two 4-story concrete buildings at Ocean Park, to cost \$200,000, and the plan of Architects Parkinson & Bergstrom for a \$40,000 city hall for Alhambra has been accepted.

H. W. Schleuter is building for the Great Western Amusement Company a pier, hotel, theater, dance hall and submarine café at Ocean Park. The entire cost will be about \$900,000. All the structures will be of concrete.

Oakland, Cal.

Building has naturally been somewhat curtailed during the holiday season, but as compared with former years the situation is highly satisfactory. The total valuation of buildings for which permits were issued last month was \$528,681, compared with \$987,294 for the previous month and \$340,897 for December, 1911.

The year's operations as a whole show a marked gain over the last few years, the total for 1912 being \$9,009,737, against \$6,992,260 for 1911, and slightly less than that for the previous year. During 1912 there were 57 permits issued for brick and steel buildings, with a value of \$2,470,300; reinforced concrete buildings, 13, valued at \$542,269; corrugated iron, 5, valued at about \$13,600; and 2213 for frame buildings, valued at about \$4,730,000.

Additional school contracts have been let during the past month, Williams Bros. & Henderson getting the contract for the shops of the new Manual Training High School at \$78,972. The building will be of reinforced concrete, with steel frame roof, metal window frames, etc. A. C. Christianson has taken the contract for the Peralta Heights school at \$39,650. The lowest bid for the College Avenue school was that of O. A. Ackerman, \$86,115.

Among the principal buildings for which plans are about ready are a 5-story Class C apartment house at 22nd street and Broadway, to cost about \$125,000, E. W. Hartmann architect, and a 6-story Class A hotel at 11th and Franklin

streets of which William Wilde of this city is the architect.

Competitive designs will be received April 10 by the county supervisors for a \$1,000,000 county infirmary. The buildings include dormitories, assembly halls, nurses' cottages, kitchens, laundry and heating plant, surgical ward, isolation building, garage, etc.

Louisville, Ky.

The value of the building work which has been projected in this city during the past year is appreciably in excess of that for the year before and the outlook is for a continuance of activity as soon as the weather permits. The building inspector's department issued 2279 permits last year for buildings estimated to cost \$6,562,777 exclusive of the cost of lighting, plumbing and elevators. In 1911 there were 2495 permits issued for construction work involving an estimated outlay of \$6,129,641.

The record month last year is held by July, when permits were issued for buildings costing \$1,075,010.

Milwaukee, Wis.

This city has shown an appreciable increase in building activity during the year 1912 as compared with the year before. Some idea of the work which has been in progress may be gathered from the statement that the gain in the value of the permits issued over that of 1911 surpasses the entire value of buildings erected in 1898 and 1900.

According to the Bureau of Building Inspection there were 4349 permits issued in the year just past, calling for an estimated outlay of \$15,370,969, which represents a gain of more than \$3,000,000 as compared with 1911.

The month of June called for the greatest estimated outlay when 544 buildings were planned to cost \$3,187,495. April showed the greatest number of permits, 749 having been issued by the building inspector.

Many of the buildings for which permits were issued last year will be finished in 1913, and among the more costly structures now in course of erection may be mentioned the Hotel Wisconsin, to cost \$500,000; the Lefty Department Store, Grand avenue and Second street, to cost \$285,000, and the new trade school at Virginia and Hanover streets, to cost \$225,000.

Minneapolis, Minn.

The members of the Master Builders' Association of Minneapolis held their annual meeting in December, which followed a dinner at the West Hotel. The meeting was thoroughly representative and various business matters were considered. The main object, however, of the meeting was the election of officers for the ensuing year, which resulted in the following choice:

President N. W. Nelson
Vice-President J. L. Robinson
Treasurer John Wunder
Secretary Eugene Young.

Nashville, Tenn.

The annual meeting of the Nashville Builders' Exchange was held on the afternoon of December 9, when officers and directors were chosen for the ensuing year. There were two tickets in the field, the reds and the blues, and although the blues won all the officers and 8 out of 12 directors there were many close contests and the balloting was not as one-sided as the result might seem to indicate.

The officers chosen for 1913 were as follows:

President R. T. Creighton
First Vice-President E. T. Lewis
Second Vice-President J. W. Patrick
Treasurer A. W. Hutchinson
Sergeant-at-Arms E. Y. Fitzhugh.

Figures taken from the city records show that in December building operations were upon a much larger scale than during the corresponding month of 1911, the figures being respectively \$148,690 and \$33,053.

The value of the building permits issued in the year just closed was \$1,411,114, while in 1911 the value was \$1,123,349.

Newark, N. J.

Although the city did not enjoy a "boom" in building operations during the year just closed, yet the total amount of vested capital as represented by the value of improvements for which permits were issued was something like \$5,000,000 in excess of that for 1911. There were 3980 permits issued in 1912 for construction work calling for an outlay of \$15,995,646, while in the 12 months of 1911 there were 2966 permits issued for construction work costing \$10,975,334, which was a falling off from the figures of 1910, which reached a total of \$13,394,812.

The month of June was the most active of the year,

when 1440 permits were taken out for work estimated to cost \$5,374,589. This figure, however, was less than that for the same month in 1911 when the total was \$5,926,461.

The biggest permit for the year was that covering the Kinney building at Market and Broad streets, estimated to cost \$660,000. Other important permits were those for the Young Women's Christian Association building on Washington street, to cost \$250,000; the new store of John Mullins & Sons, on Market street, which will cost \$95,000; Corse Payton Theater in Branford Place, to cost \$175,000, and new public school construction to cost \$338,000.

Superintendent William P. O'Rourke points out in his report that building activity for the year was unmarked by any great jumps from month to month, but showed a steady progress throughout. A great deal of work done during the year which tended to bring up the total was in the way of alterations to hundreds of buildings in compliance with the new building code.

In the Roseville, Forest Hill, Vailsburg, Weequahic Park and Clinton Hill sections hundreds of dwelling houses were erected. While there have been many private one-family houses put up there is an increasing tendency toward the construction of flats.

Philadelphia, Pa.

Had the building of two-story dwellings in 1912 represented the average for the past several years the total of operations would have exceeded all previous records. With a decline in this class of work amounting to \$7,172,955, it more than offset the gain in other directions. Statistics for the year just closed show that 10,123 permits were issued for 14,707 operations, estimated to cost \$37,173,635, which compared with 16,215 operations costing approximately \$40,030,985 in 1911. Previous records as to the number of permits issued were broken in 1912, although individual operations declined, on account of the falling off in dwelling-house work.

Builders recognized the fact early in the year that dwelling houses, particularly of the two-story type, were being erected in some sections of the city far in excess of the demand and a sharp recession in this class of building began early in the year. In both 1910 and 1911 two-story dwelling houses totaled 8009 and 7633, with respective estimated costs of \$15,944,755 and \$15,959,075, while during 1912 work on 4648, costing \$10,456,195, was authorized. Three-story dwelling-house operations also declined during 1912, the estimated expenditure being \$2,815,790 as compared with \$4,505,965 in 1911, and \$5,239,265 in 1910. While apartment house operations have, to some extent, been responsible for a portion of the decrease in dwelling-house operations, the relative gain has been comparatively small, expenditures in 1912 being \$1,307,000 as compared to \$1,066,700 in 1911 and \$1,468,500 in 1910.

Standing out prominently in 1912 was the volume of new work credited to factories, workshops and warehouses, which totals 149 at an estimated cost of \$4,129,935, while considerable in the way of additions to existing plants is classified under the heading "Additions and Alterations." Municipal buildings totaled \$461,980, while \$295,880 was expended for schools. Nearly \$3,000,000 was credited to office buildings and hotels, while the aggregate expenditure for places of amusement, largely for moving picture and vaudeville purposes, was \$363,800. Power houses together with boiler and engine houses represent an expenditure of \$388,000. Garage construction was also a factor, 249 being authorized to cost \$414,395.

Building conditions for 1913 are quite favorable. Applications have been made for several extensive contracts, including one of \$1,000,000 for a new grain elevator at Girard Point, for the Pennsylvania Railroad Company. In dwelling house work some extensive operations are planned, but as the real estate market has been dull the movement in that direction is expected to be commensurately slow. In the central district and in some residential districts values of realty have increased, but the general market has shown little real movement during the past two or three years.

The Board of Education, Property Committee, has awarded contracts recently for two 29-division school houses, one to be erected at 56th and Catherine streets, the other at 27th and Clearfield streets. They will be of brick, with terra cotta trim, and will cost \$200,040 and \$205,873, respectively. Cramp & Company have been awarded the contracts for both buildings.

Considerable interest has been aroused in the proposed erection of a 37-story office building at the corner of Broad and Locust streets, for which plans have been prepared.

Plans have been in progress for a 10-story apartment house for T. W. Barlow, 122 South 13th street, by H. L. Reinhold, architect. Tentative specifications call for a brick, fireproof building, 40 x 130 ft., with electric lighting, elevators and steam heating.

Ballinger & Perrot, engineers and contractors, have contracted with Harry Brockelhurst for the erection of 149 additional workmen's houses at Marcus Hook, Pa., for the American Viscose Company. The contractors now have work under way on 66 houses under a previous contract. The layout of the houses will be along the lines of a model English village.

B. Tourison, architect, is planning forty-eight 2½-story stone houses, 20 x 31 ft. each, to be built at Abbottsford and Wissahickon avenues, for Maurice Dillon.

The Board of Education, Camden, N. J., has had plans completed and is prepared to take bids for a 3-story school house of brick, to be erected at Mt. Ephraim and Jackson streets, Camden, N. J., from plans by Moffett & Stewart of that city. The building will be 112 x 150 ft.

Pittsburgh, Pa.

While there were a number of important buildings planned in this city during the past year the most extensive structure for which a permit was issued was the School of Applied Science of the Carnegie Technical Schools, to cost \$400,000. The city authorized 3894 building operations last year involving an estimated outlay of \$11,347,343, as against 4045 permits in 1911 costing \$12,300,963.

There were 1345 new buildings planned to cost \$7,402,322. Of this 40 represented an investment of \$2,981,250. The remaining 1305 new buildings costing \$4,521,250, shows that low cost work, especially in the home districts, predominated.

Building operations in Pittsburgh last January and February were almost totally suspended on account of the extremely cold weather. Compared with the same months of 1911 the cost totals of 1912 were \$762,014 behind the same totals for 1911, at the close of last February. Omitting the months of January and February of 1911 and 1912, last year shows a gain of \$201,406 over the previous year.

The annual banquet of the Manufacturers and Contractors Club, held in December at the Fort Pitt Hotel, was a decided success. There were nearly 250 present, consisting of contractors, supply dealers and manufacturers of builders materials.

The principal speaker of the evening was I. H. Scates, secretary of the Builders Exchange at Baltimore, who took for his subject "Organization—the Basis of Individual Success," and the keynote of it was hearty co-operation in every detail of the building business. Robert K. Cochrane, president of the Builders Exchange at Pittsburgh, made a strong appeal to all those interested in building construction in that city to affiliate themselves with that organization, not only for their own individual welfare but for that of the organization as well.

Portland, Ore.

Building in December, though better than for November, is not especially encouraging, being only \$712,110, compared with \$679,955 for November and \$1,288,476 for December, 1911. Last year started fairly well, but operations were limited during the fall and the 1912 record is by no means satisfactory. Local building values have, in fact, shown a remarkable fluctuation in the last few years, jumping from about \$13,000,000 in 1909 to the high mark of \$24,604,957 the following year. In 1911 the total dropped to \$19,095,840, and the past year's record is still lower at \$15,137,919. Some increase is noted, however, in the number of plans for construction during 1913, and contractors count on a fairly active spring.

The largest contract recently let is for a 12-story steel frame building for the Northwest Fidelity Company, to replace the old Marquam block. The ruins of the latter have been removed, but some difficulty was encountered in taking out the new footings. The contractor for the new structure is the Dinwiddie Construction Company, the reported figure being about \$750,000.

Buildings for which figures will be taken in the near future are a 4-story brick hotel at Seventh and Burnside streets, to cost \$70,000, Bennes & Hendricks, architects; and an addition, about 10 stories high and 40 by 100 ft. in area, to the Lewis building, at Third and Oak streets.

Architect R. F. Tegen of this city is preparing plans for a \$150,000 hotel for Vancouver, B. C.

Plans are on file for the Jonesmore school at 80th and Tillamook streets, the contract for which has been let at about \$70,000.

Some interesting features have developed in connection with the \$60,000 concrete grain elevator plant being erected by the Brayton Engineering Company. The bins will hold about 300,000 bu. of wheat, and the entire weight of the storage portion when filled will be about 29,000,000 lbs. In the original design a solid rock bearing was figured on and the pressure per sq. ft. on some of the piers was over 20 tons. The subsoil on the location is a cemented gravel hardpan and it was necessary to increase the size

of the footings sufficiently to bring the pressure to 8 tons per sq. ft.

Considerable complaint from owners has resulted from the rigid enforcement by the grand jury and district judge recently of a State law requiring doors of public buildings to swing out, most of the complaints being filed with the Building Department, which, of course, has no option in the matter. Carpenters are naturally willing that the law should be enforced.

Providence, R. I.

According to the annual report of Inspector of Buildings Spencer B. Hopkins, the value of building operations for which permits were issued in the 12 months of 1912 was \$8,491,700, the greatest valuation of new construction work in a year in the history of the city. The previous record was in 1911 and the figures for 1912 are more than \$3,000,000 in excess of those for that year.

One of the most important permits was that for the 16-story skyscraper at the intersection of Westminster and Weybosset streets, which when completed will be known as the "Turk's Head" Building. Other extensive operations include the new St. Patrick Church on State street, the new office building now nearing completion, at Westminster and Snow streets, the new storehouse of the Revere Rubber Company, on Eagle avenue, and the new buildings of the Narragansett Electric Lighting Company.

On the East Side the development of the apartment house movement has been emphasized more especially by the 8-story structure on Waterman street, and throughout the city numbers of "three-deckers" (three-family houses) are springing up instead of the two-family houses which have heretofore been considered a satisfactory investment.

Reading, Pa.

According to the annual report of Building Inspector Andrew J. Grove there were fewer buildings planned in this city in 1912 than there were in the year before, but the total of cost was greater last year, by reason of the better character of the improvements projected. According to the figures of the building inspector there were 386 buildings erected last year valued at \$1,571,425, while in 1911 there were 410 buildings erected having a valuation of \$1,072,825.

Building operations continue very active in the city and there seem to be no indications of the customary falling off that usually occurs at this season. Of course this is largely, if not altogether, due to the fact that weather conditions have been very favorable for outdoor work. Builders, however, are looking forward to a good business during 1913.

Richmond, Va.

The building record for Richmond was broken last year, when permits issued by Building Inspector Beck totaled a valuation of \$6,255,711. These figures compare with \$6,108,609 in the year before and \$4,012,822 in 1910. The stated values when permits are applied for are as a rule about 20 per cent below what it will actually cost to complete the work, and adding this percentage to the figures already given will give totals which rank with cities much larger than Richmond.

Building operations continue brisk and it is expected that 1913 will be marked by further extraordinary activity in all lines of the building trades.

Sacramento, Cal.

The December building record, though far below that of the same month of last year, is slightly above the year's average, the comparative figures being \$350,315 for December, 1912, and \$985,691 for December, 1911. The large total for the latter month was due to the granting of permits for several large buildings about the same time, while last month's record is made up mostly of small work.

The record for the year as a whole is considered satisfactory, though not up to the high mark set in 1911. The year's total was \$2,746,235, against \$3,087,392 for 1911, and \$2,326,606 for 1910, the number of permits being about 940, compared with 686 for 1911. As this would indicate, the year just closed has been one of marked activity in the building of homes and other small work, dwellings alone making up nearly half of the total valuation. This class of work is still active, though few buildings of much importance are coming up at present. The only large building for which figures will be taken soon is a 10-story Class A structure for the use of fruit-shipping firms, plans for which are being drawn by Architect C. S. Kaiser.

The proposal to erect this comparatively tall building has caused a movement, headed by Building Inspector Rutan, to limit the height of buildings in future to 100 or 120 ft. Some of the local architects appear to favor the idea, but so far nothing definite has been done about it.

The proposal has also been made to increase the fee for building permits, which is now regarded as comparatively low. It is believed that it can be raised over 100 per cent. without arousing much protest, and it is desired to make the building inspector's office self-supporting. The present scale is: for buildings costing up to \$500, 50c.; to \$1,000, \$1; to \$5,000, \$2; to \$10,000, \$5; and \$1 more for every increase of \$5,000.

Plans have been completed by Architect Geo. W. Kelham, San Francisco, for the 10-story Class A building for the Fresno Estate Company, Fresno, Cal. It will contain 189 offices, and the cost is estimated at \$275,000.

Salt Lake City, Utah.

It is generally conceded in building circles that never in any previous 12 months has the city expended as much as it has in the year just closed. The value of the buildings for which permits were issued in that period was \$11,500,000, while in 1911 the value was \$8,077,820. The business section has spread rapidly with a consequent increase in dwellings in the residential sections of the city. Building activity has been greater than ever before and many structures are planned for 1913.

A new business center is being developed in the vicinity of Broadway and State street and many new buildings and improvements in this neighborhood are now in course of construction or contemplated.

Everything is ready for the building of Utah's state capitol on Capitol Hill and when finished and furnished it will represent a cost of more than \$2,500,000. In the architects' competition for the design Richard K. A. Kletting was the winner. The lowest bid on the building with plumbing, wiring, heating and ventilating was that of James Stewart & Co., at \$1,106,000. The tallest building in the city and which was finished last year is that at Main and Second South streets, costing \$1,500,000. A new high school building to cost about \$700,000 is under way and the University central building and lighting plant are in progress. A long list of other improvements might be mentioned, covering buildings of all kinds.

San Diego, Cal.

The year closed in extremely satisfactory shape, the valuation for December being \$970,830, compared with \$746,221 for the previous month, and \$424,770 for December, 1911. Many inquiries are still coming out, and indications are favorable for at least the first half of 1913.

Conditions throughout the year have been very favorable to building contractors, and the total value of work undertaken during that period amounted to \$9,946,750, compared with \$5,713,605 for 1911. In 1909, which was then considered a fair year, the total was only \$2,632,100. The total has of course been swelled by special Exposition work, but the greater portion represents commercial, hotel and residence buildings of the usual types.

Among the buildings to be figured shortly are: the Benbough apartment building facing Balboa Park near Seventh street, to cost about \$100,000, and an office building at Third and D streets, to cost about \$200,000, of which Walter Keller is the architect.

Bids have just been received for the Coronado school.

San Francisco, Cal.

Building for December was somewhat disappointing, the valuation of buildings for which permits were issued being \$1,088,126, compared with \$1,207,429 for December, 1911. The total included only two Class A buildings, valued at \$80,000; one Class B, at \$30,294; 23 Class C, at \$305,120, and 152 frame buildings, at \$510,692.

The record for the year as a whole is the best since 1909, the valuation being \$23,339,568, covering 6316 permits. Compared with this in 1911 were 6079 permits, with a valuation of \$20,915,484. An analysis of the records shows that wooden construction exceeded other types, both in number of buildings and in total valuation, the number being 2523, with a value of \$8,561,669. Only fourteen permits were issued for Class A buildings, with a combined value of \$2,206,304, other types being as follows: Class B, 23 permits, \$2,589,077; and Class C, 280 permits, \$7,892,084. Probably the most notable developments of the year are the building up of the apartment house district between Powell street and Van Ness avenue and the construction of dwellings in the southwestern part of the city.

The largest contract let during December was for Machinery Hall of the Panama-Pacific Exposition, the largest building of the fair, the award going to the W. W. Anderson Company on a bid of \$509,900. From this the bids ran up to \$599,000. The lumber will be furnished by the Exposition and will amount to over six million feet, board measure, bids for which are now being taken. The building is to be finished in 248 days.

The material market opens the year with a general feel-

ing of firmness, the demand having been heavier than usual through the holidays. Structural steel contractors are greatly hampered by scarcity of material, being unable to get delivery before September, while builders are anxious to proceed at once. Reinforcing material is also rather scarce, local mills being sold out at the moment, and spring construction is likely to suffer some delay on this account. A shortage is also reported in building hardware, though some of the jobbers have been carrying large stocks, and could probably fill any orders for ordinary lines. Lumber shows little change, but if local, eastern and export demands are up to expectations higher prices are sure to rule in the spring. Lime and cement are steady, and crushed rock is firm, owing to the heavy requirements of highway and harbor work. Brick shows no change, and manufacturers of pressed brick and terra cotta appear dissatisfied with the year's business.

The Masons' and Builders' Association held its thirty-seventh annual banquet in the ballroom of the Palace Hotel on the evening of December 14. An unusually large number were present, about 150 being seated at the tables, where James A. Wilson, president of the Builders' Exchange, acted as toastmaster. The menu card was a masterpiece, being decorated with historical illustrations typifying the development of building from ancient to modern times. The banquet was followed by a musical entertainment and ball.

Figures are being taken on a number of fairly large buildings, several of which have already been mentioned. Many jobs are temporarily delayed, owners being disposed to wait until tenants can be found for hotel, store and office buildings. Among the larger buildings now coming up for figures are: a 5-story concrete factory for Gantner & Mattern, on Mission street, Geo. Kelham, architect; estimated cost, \$125,000; a Catholic church, on Bush street, to cost about \$70,000, B. D. Brouchoud, architect, and a 6-story brick and concrete hotel, at Geary and Jones streets, A. Schroepfer, architect.

Scranton, Pa.

While the record for 1912 is somewhat below that of the year previous the results are nevertheless highly gratifying when it is considered that the building season was seriously interrupted by the laborers' strike. In the months of June and July alone the value of the buildings for which permits were granted fell off \$300,000, as compared with the same months of the year before.

Superintendent F. L. Walter of the Bureau of Building Inspection shows that in the year just closed 687 permits were issued for construction work valued at \$1,580,696, while in the 12 months of 1911 there were 763 permits issued for work costing \$1,700,125.

Seattle, Wash.

Owing to the fact that three fireproof buildings were planned in December calling for an expenditure of \$608,000, the figures for that month show a very decided increase when contrasted with those for December, 1911. There was also a slight increase in the value of the residences for which permits were issued. According to the report of Superintendent of Buildings R. H. Ober there were 568 permits issued for new construction work calling for an estimated expenditure of \$968,350 in December last, while in the same month of 1911 there were 555 permits issued for work costing \$326,890.

Of the work planned in December last two permits were for fireproof office and store buildings costing \$400,000 and \$108,000 respectively, while one permit was issued for a \$100,000 fireproof warehouse building. In the same month of 1911 only one permit was taken out for a fireproof structure and six to cost only \$75,000. Of detached residences 108 were planned costing \$211,490 as against 102 for which permits were issued in December, 1911, costing \$150,940.

For the 12 months of the year just ended there were 9819 permits issued for construction work estimated to cost \$8,415,325. In the 12 months of 1911 there were 10,959 permits issued for construction work involving an outlay of \$7,491,156. Of the totals for 1912 there were 1816 detached residences planned costing \$2,861,760, while in the year previous 2133 detached residences were planned to cost \$2,893,820.

St. Paul, Minn.

The volume of building operations in this city during the year just brought to a close was appreciably less than during the previous year. According to the figures given out at the office of the Building Inspector there were 3591 permits issued last year for building construction, valued at \$8,051,417, and in the 12 months of 1911 there were 3764 permits taken out for work involving an outlay of \$8,915,009.

So far as the number of permits issued are concerned May was the banner month, with 460 permits issued for

building improvements, costing \$936,063. On the other hand, only 259 permits were issued in November, but the estimated cost of the work projected was \$1,092,696.

It is expected that the current year will prove a record breaker, this opinion being based upon the assumption that the new Union depot will be commenced, the public library erected and the Merchants' National Bank building, the Gordon & Ferguson building, together with several others which are in prospect carried to completion.

St. Louis, Mo.

While the number of permits issued last year were less than the year before the estimated cost of new structures planned in 1912 was more than \$2,000,000 in excess of those projected in 1911. A feature of the situation has been the demand for apartment houses, more than 300 of this class of building having been planned, and the craze for this style of living has still further developed during the last few months.

The annual report of Building Commissioner James N. McKelvey shows 8593 permits to have been issued last year for new buildings, alterations and repairs, calling for an outlay of \$20,676,403, while in 1911 there were 8940 permits taken out for construction work, costing \$18,607,555.50. The total estimate of cost does not include the \$2,600,000 to be spent on the 21-story building of the Monward Realty Company, foundations for which are now being completed, at Broadway and Olive street, and a permit for the erection of which has been refused by the Building Commissioner.

The estimated cost last year of 1028 brick dwellings was \$3,507,535, while in 1911 there were 739 brick tenements, costing \$4,497,307. Slightly more than half as many frame dwellings were authorized last year as in the year before. Fewer permits were issued for amusement houses, for small stores, frame tenements and schoolhouses. There were 10 municipal buildings authorized and 5 permits were issued for hospital construction, 9 for churches and 14 for schoolhouses. There were also 22 mercantile and office buildings authorized, to cost approximately \$3,205,270.

Syracuse, N. Y.

During the past year 994 new buildings were erected in the city of Syracuse at a cost of \$3,811,631. Of this number 690 were houses of frame, brick and concrete construction.

In his report to the Commissioner of Public Safety Superintendent of Building J. E. Miles calls attention to the fact that all classes of construction in Syracuse have been more modern and safer during 1912 than ever before. Including the remodeling of buildings for the year the total is \$4,487,861 against \$5,238,184 in 1911.

In classifying the work it may be stated that there were 59 new brick buildings costing \$773,630 and 890 new frame buildings costing \$2,840,431. There were also 45 new concrete and steel buildings costing \$197,570.

Tacoma, Wash.

The total value of building operations for which permits were issued last year was slightly in excess of that for 1911. There were in all 1740 permits taken out, calling for an estimated outlay of \$1,876,487, while in 1911 the estimated cost of the building improvements projected was \$1,707,644.

September showed the greatest activity, when buildings costing \$282,840 were planned, and January was the smallest month, with \$106,053.

Tampa, Fla.

An idea of the activity in the building line during the past year in this place may be gathered from the statement that the value of the operations was nearly \$400,000 in excess of that for the previous year. In December permits were issued for buildings estimated to cost \$481,547, as against \$145,842 in December of the year before.

For the 12 months of the year just closed the value of the construction work for which permits were taken out was \$1,882,850, while in the previous year the value of the operations was \$1,497,954.65.

The city ordinances now cover concrete buildings and skyscrapers and the passage of the new building code brings the ordinances up-to-date in that respect and the city has been placed in the first class according to the classification of the Southeastern Underwriters' Association.

Toledo, Ohio.

The annual report of the city Building Inspector shows that during the year just ended 2228 permits were issued for building improvements, having a total valuation of

\$5,321,790. These compare with 1960 permits and a total valuation of \$3,747,266 in the 12 months of 1911.

The report shows that 1029 dwelling houses were erected, 34 new factories built, 114 garages and a number of flats.

The December report showed 104 permits issued for construction work, valued at \$230,123, while in December, 1911, there were 82 permits issued for building improvements, valued at \$141,757.

Winnipeg, Canada.

The year just closed has given Winnipeg a new building record, with a total of \$20,174,550, which is an increase of \$1,892,250 over the figures of the year before. An idea of the tremendous strides which this city has made since the beginning of the present century is indicated by the figures for 1900, when the total value of building operations for which permits were taken out was \$1,441,863. Since that time the gain was continuous up to the present, with the exception of a lull in 1907, 1908 and 1909.

Law in the Building Trades

Risk of Injury Assumed by Carpenter

If a carpenter enters upon work in an insufficiently lighted place, without objecting, he assumes the risk of consequent injury. (Kentucky Court of Appeals, *Skinner vs. Railway Company*, 136 Southwestern Reporter 644.)

Application of Payments on Account

If no direction be made by a debtor who owes several accounts to one person, in making a payment, the creditor can apply it as he sees fit. If there be no direction or specific application by the creditor, the law applies it to the oldest account. A materialman, who keeps separate accounts for material furnished a contractor for several jobs and who receives checks from the contractor drawn by one of the owners and payable to the contractor "on contract," cannot apply them to accounts for material furnished other owners and afterwards claim a lien against that owner as to the amounts of such check without notice to him at the time of such diversion of payment. (Washington Supreme Court, *Hughes & Company vs. Flint*, 112 Pacific Reporter, 633.)

Ratification of Acts of County Officers

Even if a committee of a county board of supervisors had no legal authority to award a contract to erect a hospital, the contractors are entitled to recover for their work if the full board ratified the committee's acts. (New York Supreme Court, Fourth Appellate Division; *People vs. Board of Supervisors of Oneida County*, 128 New York Supplement 638.)

Employer's Duty Concerning Scaffolding

A contractor, having constructed a safe scaffold, on which loose planks are to be placed by his employees for staging, which are to be shifted from place to place as the necessities of the work require, must furnish therefor, at places within a reasonable distance of the point where they are to be used, planks suitable in quantity and quality; but need not see that they are adjusted and kept in place. (Minnesota Supreme Court, *Rihmann vs. George J. Grant Construction Company*, 131 Northwestern Reporter 478.)

Liability for Injury Caused by Defective Scaffold

Under the provision of the New York Labor Law, which requires an employer to provide safe scaffolding, he cannot avoid liability for injury to a workman by showing that defects in the scaffold were latent and not discoverable. (New York Supreme Court, *Erie County Trial Term; Smith vs. Variety Iron & Steel Company*, 130 New York Supplement 277.)

Liability of Architect for Neglecting Supervision

An architect's liability for failing to use ordinary skill in supervising work is not discharged by the owner's payment to the contractors of the agreed price, notwithstanding their failure to perform according to contract, especially where in such settlement the owner expressly reserves his rights against the architect. (New York Supreme Court, Appellate Term, *Schwartz vs. Kuhn*, 126 New York Supplement, 568.)

(For Builders' Supplies and Equipment, see page 104.)

BUILDERS' APPLIANCES AND EQUIPMENT

Some Things of Seasonable Interest to Those Having
to Do with the Building Business

Oshkosh Concrete Mixer

The Oshkosh Mfg. Company, Oshkosh, Wis., has issued a folder in which its concrete mixer with quadruple mixing motion is illustrated and described. The various parts of which the mixer is composed and their uses are given, together with several views of the machine fitted with different attachments; also a picture of the single-train driving mechanism and special multiple disc friction clutch designed especially for use in the company's mixer. This clutch of fiber frictions or discs running between metal discs allows a smooth starting, positive holding clutch, easily operated and easily adjusted. The discharge chute on this mixer besides performing the duty of discharging the material from the interior to the exterior of the drum fulfills the purpose of giving the quadruple motion to the mixing of the concrete. The last page of the folder carries a view of a mixer and its crew, together with a letter from a firm of general contractors testifying to the very satisfactory manner in which the mixer did its work.

The New Fray Brace

In this brace are combined features which make it most desirable when the firmest possible grip, with large capacity of chuck, is required. The John S. Fray Company,

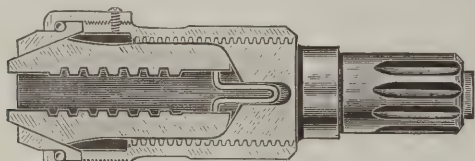


Fig. 1—The Jaws Have a Specially Formed and Applied Spring Permitting Adjustment

The New Fray Brace

Bridgeport, Conn., is placing it on the market. The brace readily takes $\frac{1}{2}$ -in. round shank drills, either straight or taper, with the largest sizes square shank bits; and from this, with the same jaws, down to $\frac{3}{8}$ in. or less, holding each and all equally firm. The tool is shown in Fig. 1.

The principal points in this brace do not consist so much in what may be called new methods for holding and driving bits and drills as the combining of an enlarged socket which carries the jaws, with a ballbearing sleeve, acting on a steel ring to close the steel jaws on the outer end. The rear is closed by the incline forward at the base of the socket. The jaws illustrated in Fig. 2 have a specially formed and applied spring, which permits all possible adjustment with perfect freedom of action, at the same time centering the inside ends as the jaws are brought together by the sleeve as it is screwed onto the socket.

Richards-Wilcox New House Organ

We have just received the first issue of the very attractive house organ which will be published monthly by the Richards-Wilcox Mfg. Company, Aurora, Ill. It is entitled "DooR-Ways," and in each issue there will be two or three pages devoted to matters of special interest to architects, builders and contractors. The first issue of the little work carries upon the front cover a design representing "Prosperity," and upon the head of the female figure is a crown bearing the figures 1913. She is shown framed in a doorway, the sliding door being fitted with Richards-Wilcox track and hangers. The first page of printed text carries a facsimile of the coupon submitted by a Chicago architect who received the prize of \$25 offered by the company for the best name for its house organ. This the company points out "ties up" splendidly with its trade mark and typifies its largest line of products—sliding door hangers for all purposes. Among other matters in

this first issue of the company's house organ is a portrait and brief sketch of W. H. Fitch, the president and general manager. Several pages are given up to talks on the subject of advertising; there are illustrations of a number of the company's specialties; another page is given up to humorous matter, and last but not least is a birdseye view of the company's main office and works at Aurora, together with a list of the specialties turned out.

We understand that the company will be glad to send a copy of "DooR-Ways" to any reliable architect, builder or contractor who may make application for it.

Stewart Double Oven Ranges

One of the features of house planning which does not always receive the attention it would seem to deserve is the kitchen and its equipment. Naturally the attempt should be to make this room convenient in every respect both as regards its relation to the dining-room and also with regard to the cooking apparatus which is therein installed. At the present day thoroughly up-to-date apparatus is required and the architect who is alive to the times specifies the sort of range which will in every respect meet the requirements of the case. The builder is also inter-

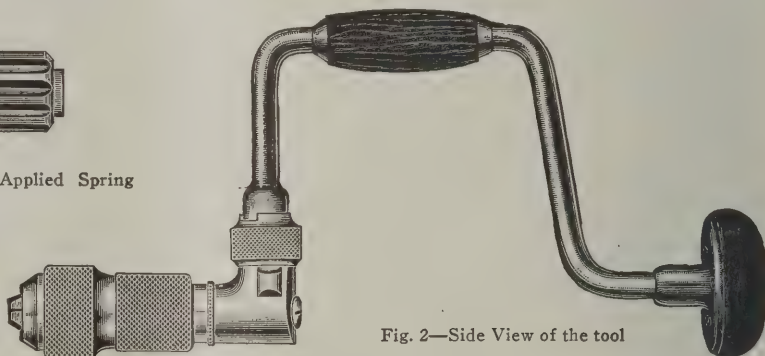


Fig. 2—Side View of the tool

ested in up-to-date apparatus and it goes without saying that the house owner is equally concerned. All of these will, therefore, find much that will command their attention in an attractive catalogue illustrating and describing the Stewart Double Oven ranges for coal or wood in combination with gas as a fuel, manufactured by Fuller & Warren Company, Troy, N. Y. Among the early pages of this little work attention is given to a line of double oven ranges, especially adapted for use in private dwellings, small residences and hotels, or in places where a large amount of cooking and baking is required. Special attention is also given to combination coal and gas ranges which are furnished in several different styles. The convenience and the comfort of having a range that will use both coal and gas at the same time is too obvious to require any argument. Where city gas supply is not obtainable the ranges will operate with gasoline gas, Blaugas, Springfield gas, etc. The illustrations clearly indicate the appearance of the finished goods, while various attachments and fixtures are shown in detail. Any architect or builder who may desire a copy of this attractive catalogue can secure one by making application to the company.

The Red Book

The United States Gypsum Company, 205 West Monroe street, Chicago, Ill., has just issued from the press an interesting handbook of useful information for architects, contractors, builders and plasterers. It is known as the "Red Book" and consists of 40 pages of matter relating to hard wall plaster, what it is made of and what are its advantages. Some interesting comments are presented in regard to Sackett Plaster Board, the mixing and

application of cement plasters, wood fiber plasters and prepared plasters. There is a short chapter on finishes and a number of "pointers" which the builder will find of suggestive value. What is referred to as a masterpiece of efficiency and economy is Pyrobar Gypsum Tile for fireproof partitions, wall furring, column covering, pent house walls and roofs, pipe chases, vent ducts, etc. The concluding pages are given up to a series of tables showing the number of square yards and feet in rooms with ceilings ranging from 7 ft. to 12 ft. in the clear. We understand that a copy of this handbook will be sent to any reader of *The Building Age* who may make application for it.

"Perfect Handle" Drawing Knife

We present in Fig. 3 of the accompanying illustrations a general view of the "Perfect Handle" Drawing Knife which has been placed upon the market by the H. D.



Fig. 3—The Perfect Handle Drawing Knife

Smith & Company, Plantsville, Conn. It is a tool in which all carpenters and builders are likely to be interested, embodying as it does special features of construction. The illustration shows the drop forging of the knife before the wooden handles are put on. The drop forgings are made in heavy drop hammers and every detail is given the most careful attention. The blade of the drawing knife is a solid piece of crucible steel from edge to back and is "whale bone" tempered. Special reference is also made to the handle feature of the knife, the claim being made that once the wooden handles are put on it is impossible to pull them off.

Kno-Fur Expanded Metal Lath

A form of metal lath in which the furring is made an integral part is that which is being manufactured and introduced to the attention of architects, builders, contractors, etc., by the North Western Expanded Metal Company, 904 Old Colony Building, Chicago, Ill., and which is known as "Kno-Fur." This lath, a view of a section of which is presented in Fig. 4 of the engravings, is made by special process which results in meshwork ribs running obliquely across the sheets at the same angle as the strand of the meshes. The forming of these ribs produces a small truss similar to the roof or porch truss, resulting, it is

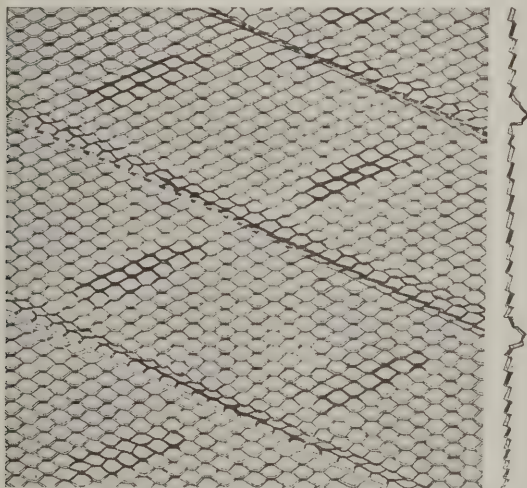


Fig. 4—View of a Section of "Kno-Fur" Metal Lath

claimed, in an extremely rigid lath which can be successfully used on centers up to 32 in. for side walls and 24 in. on ceilings. The U-shaped rib referred to is clearly seen at the right in the illustration, this representing a section through the lath. The company furnishes the lath in Nos. 24, 25, 26 and 27 gauge, and makes it from a special acid-resisting sheet which is coated with the highest grade of carbon paint. There are nine sheets in a bundle, each sheet being 22 x 96 in. in size. The weight per bundle varies from 56 lb. for No. 24 gauge to 39 lb. for No. 27 gauge.

Thor Electric Improved Laundry Machines

We have received from the Hurley Machine Company, with general office and works at the corner of Clinton and Monroe streets, Chicago, Ill., a copy of the seventh edition of Catalogue "G," illustrating and describing its line of Thor electric laundry equipment for installation in private homes, apartment buildings, country clubs, hotels, hospitals, sanitariums and other institutions. The private home and institution demand a satisfactory solution of the laundry problem and how well the Thor electric equipment has solved this problem is evidenced by the fact that the machines in question are used in practically every city in the United States where electricity is available. This catalogue illustrates and describes 36 different sizes and styles of electric washing machines ranging in price from \$30 to \$500 and in addition to these are ironing machines, solar clothes dryers, etc. An interesting feature in connection with the matter referred to is a plan of a laundry room for medium-sized homes and apartment buildings, showing the position of the laundry machine, tubs, gas stove, etc. Plans are also given of laundry rooms for high-class homes, showing more elaborate equipment than in the case first mentioned. The statement is made that the motors on all Thor electric laundry machines are operated on the same size wire that is used for lighting. Every contractor and builder is likely to be interested in the information presented within the covers of this catalogue, a copy of which will be mailed free on request to the company.

New Attachment for Luther Grinder

An attachment for its No. 14 Grinder, and one that makes it more valuable than ever before, has just been placed on the market by the Luther Grinder Mfg. Com-



Fig. 5—New Attachment for Luther Grinder

pany, 1317 Michigan street, Milwaukee, Wis., and which is presented in general view in Fig. 5 of the engravings. The small grinder illustrated has been before the trade for some little time, but the tool rest used in conjunction therewith is something entirely new and renders the grinder of special value for use. The improvement consists of a special guide coming up on each side of the grinding wheel. The knife is sharpened on the side face of the wheel, the guides insuring that just the proper bevel is maintained. The wheel turns from the operator which obviates any danger of the knife being jammed between the guide and the wheel, as the wheel continually lifts the knife. The point is made that sharpening the tool on the side face of the wheel gives a finer and smoother edge than could otherwise be obtained. It leaves it also with no graining, especially if the knife is moved forward and back while being sharpened. This guide is also well adapted for sharpening scissors, as they can be easily held at exactly the proper bevel. Altogether the outfit makes an ideal sharpening machine for the home.

Profit Sharing by the L. S. Starrett Company

In an announcement issued in December by the L. S. Starrett Company, Athol, Mass., reference was made to the past year as one of prosperity and progress, and attention was called not only to the gradual and steady increase in the sales of its product but to the manifest improvement in conditions inside the factory. The employees have shown that they appreciated more than ever before the fact that their interests and those of the company are identical and that quality in the product turned out is the chief and indispensable thing, and that next are efficiency and loyalty. The company expresses the feeling that the increase in efficiency due to intelligent and interested industry in its plant during the past year has been so general and has been such an important factor in the healthy growth of its business that some special recognition of it should be made. It was, therefore, voted by

the directors of the company at a meeting held December 11 to pay as soon after the 1st of January, 1913, as practicable, to each person in the employ of the company on that date a sum equal to 2 per cent of the entire amount of wages paid to such employee during the year 1912.

Some New "Yankee" Tools

North Bros. Mfg. Company, Lehigh Avenue, Philadelphia, Pa., has added to its already extensive assortment of "Yankee" tools some new patterns which cannot fail to interest a large class of our readers. The new goods include the "Yankee" Plain Hand Drill No. 1430, illustrated in Fig. 1 of the engravings; the "Yankee" Plain Breast Drill No. 1455, shown in Fig. 2 of the cuts, and the "Yankee" Chain Drill No. 1500, shown in Fig. 3. The "Yankee" Plain Hand Drill is provided with a wood handle 4 in. long and 1½ in. in diameter, which can be detached from the frame by the milled nut in order to use

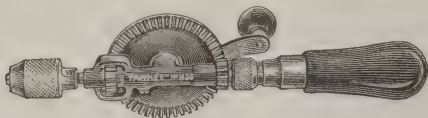


Fig. 6—"Yankee" Plain Hand Drill

the interior of the handle for a magazine or the drills. The tool has a single speed with three-jaw chuck to hold round shank drills only up to 3/16 in. diameter inclusive. The large gear is 3½ in. and the small gears on the spindle 1 3/16 in., all having extra strong cut teeth. The thrust on the spindle is taken by hardened steel bearing in the lower end of the frame in place of ball bearings and is so arranged that any wear can readily be taken up. The entire length of the drill is 10½ in. The plain breast drill jaws are of tool steel and hold round shank drills only up to ½ in. diameter inclusive. The length of this drill is 16½ in. The "Yankee" chain drill shown in Fig. 3 has three-jaw chuck the same as used on the "Yankee" breast drill. The chuck body is of malleable iron 2¾ in. long and 1½ in. in diameter. The three jaws are of tool steel

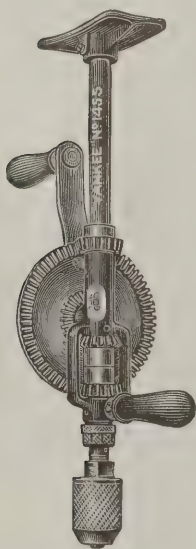


Fig. 7—"Yankee" Breast Drill

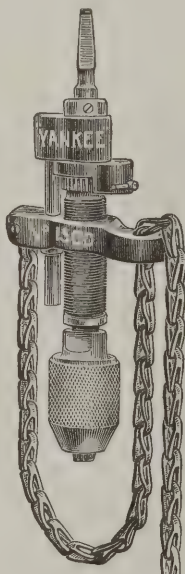


Fig. 8—"Yankee" Chain Drill

Some New "Yankee" Tools

and the chuck holds round shanks only up to ½ in. diameter inclusive. The chain drill is referred to as a distinct improvement on similar tools, its distinguishing features being its convenience and rapidity of operation and automatic friction and ratchet feed.

Catalogue of Builders' Hardware

We have received from the National Mfg. Company, Sterling, Ill., a copy of its catalogue of builders' hardware for 1913. It is an attractively printed publication of 80 pages profusely illustrated with well executed engrav-

ings and is bound in paper covers with embossed side title. In this edition of the catalogue will be found illustrated and described the company's regular line of builders' hardware and hardware specialties, together with those of new goods placed on the market in the past six months. These goods include a wrought steel beveled sash lift known as No. 135; Parliament butts and safety hasps which are made of cold rolled steel in any finish desired. The slot is extra large and is cut the long way of the strap, which leaves more metal around the slot and gives extra strength. The company points out that it has always been its policy to pack goods in the way most convenient for the dealers, so it began by packing japanned butts with screws and this method is now used in packing bright steel butts of all designs both common and ornamental. This is referred to as a time-saving feature and of practical selling value. Various illustrations are accompanied by sufficient descriptive data to cover the salient features and the make-up of the catalogue is such that the architect and the builder will find it a convenient and valuable work for reference.

Jennings Hand Saw

C. E. Jennings & Co., 42 Murray street, New York, are manufacturing the C. E. Jennings arrow head saw to run without set, No. A70½. It is not expected that a saw to work well without set will do as fast work



Fig. 9—C. E. Jennings' Arrow Head Saw, to Run Without Set

as a saw that is set, but this tool is recommended by the manufacturers for fine work, where it is often desirable to use the surface as left by the saw without further attention, thereby making possible a fine smooth joint without planing or other finishing process. The saw is absolutely guaranteed by the house to run well without set in either seasoned lumber or lumber not thoroughly seasoned, and is offered for high-grade work.

This saw is made in 20, 22, 24, 26 and 28 in. lengths, having 10, 11 or 12 teeth per inch, and is put up in boxes of one-third dozen. Another feature is the shape of the blade which in a 26-in. saw is 6 in. wide at the butt and 1½ in. at the point. The purpose of this is to reduce the frictional surface by exposing less of the blade area to the wood. The same kind of saw is also made for rip sawing, but not coarser than 6 points to the inch.

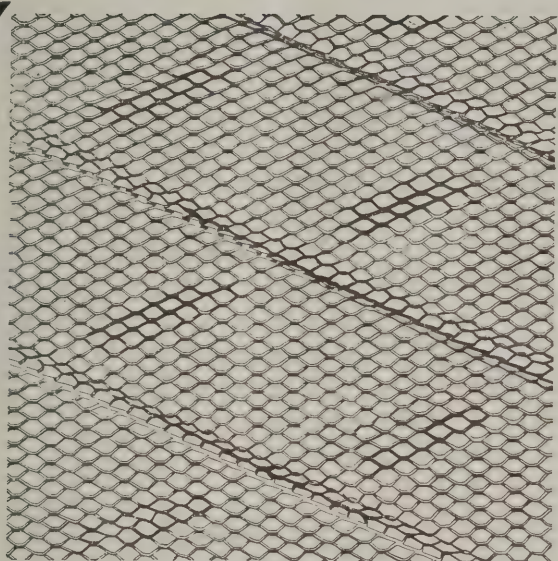
Myers & Brother's 1913 Calendar

"Take off your hat to the Myers pumps and hay tools" is the wording which appears at the top of a poster calendar sent out by F. E. Myers & Brother, Ashland, Ohio. The lettering referred to is printed over a farm scene in colors, the picture depicting an attractive, up-to-date farm house and a short distance away is the barn where a load of hay is being put into the mow. The barn is equipped with Myers' Stay-On Door Hangers, hay carrier, unloader, etc., the entire make-up being exceedingly effective and well calculated to serve the purpose for which the poster has been issued. An idea of its size may be gained from the statement that it is 16½ in. wide and is 48 in. in height when hung upon the wall. The bulk of the space is thickly covered with illustrations of leading specialties of the concern. The leaves constituting the calendar proper are attached to the center of the poster in such a way as not to obscure to any extent the pictures of the pumps, fittings and hay tools.

This 1913 poster calendar, we understand, has just been mailed to over 40,000 dealers in the United States and foreign countries handling Myers' pumps, hay-unloading tools, door hangers, etc. The company has been using this style of calendar for over 30 years, making changes from year to year in the style of the heading and in the way of additions of new goods. The dealers use this calendar for ready reference, often selling goods to their customers directly from it. In many instances we understand dealers have kept all of these calendars hanging on one nail, the new one being placed over the old one as received from year to year.

(For trade notes see second page following.)

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IMPORTANT: We can ship you any one of our products within 24 hours of receipt of your order. Does this mean increased efficiency for you?

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904 OLD COLONY BUILDING, CHICAGO, ILL.

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Does away
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ing the Plaster.

KNO-FUR EXPANDED
METAL LATH makes furring

strips unnecessary.

KNO-FUR'S "U" shaped rib imbeds itself in the plaster with equal ease on single side or solid partitions.

KNO-FUR'S mesh work ribs are small trusses of similar construction to the bridge truss. This gives extreme rigidity and permits of wide spacing.

KNO-FUR is acid resisting, coated with highest grade carbon paint, and cut from U. S. Standard gauge sheets, the thickest gauge standard used.



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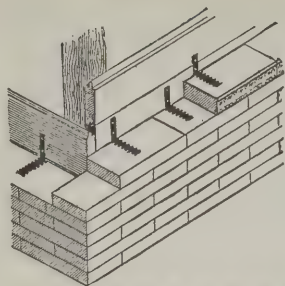
Also—you save money—you save time and labor—and you get a much more satisfactory job—

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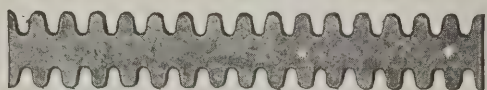
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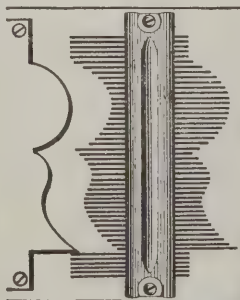
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A New Tool



especially designed to reproduce irregular surfaces or curves, as required by pattern and cabinet makers, architects, builders and carpenters.

By simply pressing the rods in the gauge the exact profile of the object is obtained.

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2-inch ...30c. 5-inch ...75c.
3 " ...45c. 6 " ...90c.
4 " ...60c.

Style B 8, 10, 12, 14 inch.
Prices on application.

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New York**

TRADE NOTES

The United States Gypsum Company, 205 West Monroe street, Chicago, Ill., is distributing an attractively illustrated pamphlet relating to Ivory cement plaster, which is one of its specialties. The illustrations are half-tone engravings of buildings in connection with which Ivory cement plaster has been used. The claim is made that this is a pioneer among hard plasters, backed by over 20 years of careful study and practical experience. It is plastic; works smooth and clean; pleases the mechanic and helps him to do good work; it sets sufficiently slow to permit thorough work but so much faster than lime that the carpenters can follow the plasterers without loss of time. It is claimed to adhere equally well to lath, Sackett plaster board, brick or other plastering surfaces.

The "Lightning Line" for January, which is the house organ of the J. A. Fay & Eagan Company, 221 to 241 West Front street, Cincinnati, Ohio, contains much interesting information relative to some of the leading lines of woodworking machines turned out by this enterprising establishment. Among the interesting articles mention may be made of "Cost of Making Blind Slats Reduced"; "A New Furniture Factory"; "Taking the Band Saw to the Work," together with some timely comments about the New Year and the 1913 Model Lumber Mill which is used as the cover design for the January number of the publication.

Mack & Co., Brown's Race, Rochester, N. Y., has issued the second edition of an interesting booklet entitled "True Stories" by various authors, most of whom are woodworkers. The stories relate to "Barton" tools which the company manufactures and embrace chisels and gouges, turning tools, carving tools, drawing knives, plane irons, broad axes, coopers' tools, etc. Not the least interesting part of the booklet is a page on the "Care of Tools." We understand that a copy of this booklet will be sent to any reader of *The Building Age* who will forward to the company his name and address.

Chain Belt Company, Milwaukee, Wis., makers of elevating, conveying and concrete machinery, has issued an attractive poster calendar for the new year bound at top and bottom with metal strips and embellished with a large panel picture of the "Chain Belt Mixer—the mixer with the bulge." The leaves constituting the calendar proper are attached to the poster below this picture and the printing is in white letters and figures upon a delicate shade of green.

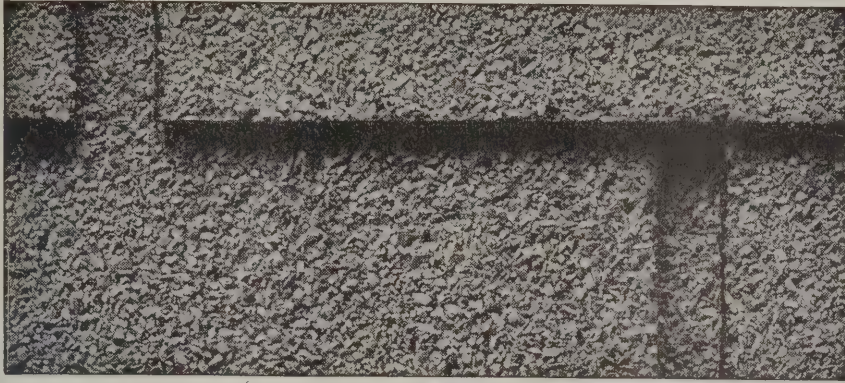
The vacancy in the office of secretary of the Luther Grinder Mfg. Company, 1317 Michigan street, Milwaukee, Wis., was recently filled by the election of L. L. Newton, who was also made a member of the board of directors. Mr. Newton has been in charge of the advertising of the company for the last year or more and has been connected with the company in various capacities for many years prior to that. Mr. Newton is at present the secretary of the Advertisers Club of Milwaukee, and while acting as secretary for the Luther Grinder Mfg. Company still has charge of their advertising.

Duncan M. Robertson, 156 Fifth avenue, New York City, is desirous of securing up-to-date manufacturers' data as to materials, equipment and methods of building construction.

The January issue of the "Grinnell Automatic Sprinkler Bulletin" sent out quarterly by the General Fire Extinguisher Company, Providence, R. I., is replete with interesting matter relating to automatic sprinklers. One of the leading features of this issue is a short article illustrating and describing the wire glass house and the practical demonstrations of the work of Grinnell Automatic Sprinklers at the recent Water Conservation Exhibit at Philadelphia and which were mentioned in these columns a short time ago. There are various other illustrated articles, together with a list of 176 fires under Grinnell Sprinklers reported between September 1 and December 1, 1912. Not the least interesting feature of the *Bulletin* is a list of officials identified with the various departments of the company's business, together with an enumeration of plants and warehouses.

Chicago Portland Cement Company, Chicago, Ill., has been favoring its friends in the trade with a dainty calendar for the new year, the printing being in colors and the mounting upon a delft blue background. It carries the statement that the bond of friendship which exists between its customers and the company is not due entirely to the sterling worth of its product, although its "ability

(Continued on page 60)



This Cut Shows the Surface of Flex-A-Tile Shingles—Beautiful—Convenient—Durable.

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FLEX-A-TILE Asphalt Shingles

are made of solid asphalt and are surfaced with chipped slate and granite, rolled into the asphalt under tremendous pressure.

They come in two colors, rich deep red and greenish gray—the natural colors of the slate and granite—everlasting and non-fading.

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Structural Steel and
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For Floors in Stores, Churches, Depots, Kitchens, Halls,
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Used on steel work of many of New York's most
prominent structures. Also has durability
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With our **TRIPLE TIER RACKING SYSTEM** green blocks can be stacked three high direct from machine with inexpensive home-made rigging. This economizes space, reduces off-bearing distance and above all insures slow, even, damp, perfect curing and bleaching. Plans and blue prints free to customers.

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to bind has helped however." It is further stated that "sincerity, truth, justice—these also are the things that retain old and create new friends." The make-up of the calendar is such as to render it a pretty as well as useful ornament to hang within convenient reach.

Alabastine Company, 750 Grandville Road, Grand Rapids, Mich., will send new samples of its Alabastine wall tint and Alabasco Flat Wall Paint to any architect, builder or contractor who is interested in learning of the merits of this successful interior decorating combination. Alabastine is a dry powder ready to mix with cold water and is applied with a regular 7 or 8 in. wall brush. It is put up in 5 lb. packages in white, tints and colors, and is also furnished in bulk for large jobs. Alabasco comes in the same velvet-like water color tints as Alabastine. It is referred to as being "exquisitely soft and artistic on the walls," and when properly applied does not chip, peel or rub off. It is supplied in liquid form ready for use.

Lane Brothers, Poughkeepsie, N. Y., are distributing among the trade leaflets illustrating some of their leading lines of product, such for example as Lane's Patent Standard Steel Parlor Door Hangers, Lane's Patent Tackle Blocks, Lane's Ball Bearing Trolley Barn Door Hangers, etc. The point is made that the Lane Standard was the first single-rail steel parlor door hanger on the market and strong claims are made for its strength, durability, simplicity and ease of movement.

The Diehl Novelty Company, well known to readers of *The Building Age* as the manufacturer of Diehl's storm sash and screen hangers and located for many years at Sheboygan, Wis., has just taken possession of its new factory building at Glenbeulah, Wis.

S. H. Pomeroy Company, Inc., successors to Voightmann & Co., 427 West Thirtieth street, New York City, has just furnished for installation in the new department store of Stern Brothers, in course of erection on West Forty-second and Forty-third streets, between Fifth and Sixth avenues, 316 of its double-hung No. 60 hollow metal fire retardant windows.

Taintor Mfg. Company, 113 Chambers Street, New York City, will send to any carpenter or building mechanic having occasion to set saws an interesting booklet entitled "Suggestions on the Care of Saws." The company makes the well-known "Taintor Positive Saw Set," which is meeting with a very gratifying demand at the hands of the trade. The booklet in question contains a great number of valuable suggestions on the subject indicated and cannot fail to prove valuable to every building mechanic into whose hands a copy may come.

L. Ferdinand Zerkel, for a number of years identified with lumber, contracting, planing mill and building material concerns in Virginia, has established his headquarters at Luray, Va., as a jobber and manufacturers' agent for the territory along the Norfolk and Western Railroad from Basic, Va., to Charleston, W. Va., and on the Southern Railroad from Strasburg to Manassas, Va.

The feature to hold the attention of the recipient of the last number of *Graphite*, published by the Joseph Dixon Company, Jersey City, N. J., is a series of pictures of noted automobile drivers and winners of important road and other races during 1912. The pictures show each driver as he appears at the wheel of his car, and accompany a very interesting article giving a summary of the automobile races of the year just closed. In the article the various drivers give high praise to Dixon's Graphite lubricants and refer to the important part which they play in the winning of races. Another feature of this issue of *Graphite* is a picture of the Ritz-Carlton Hotel at Philadelphia during its process of erection. Between 1200 and 1700 tons of steel work were used for the superstructure of this building and all of it was painted with a shop coat of Dixon's silica graphite paint. With its issue for December, 1912, *Graphite*, published by the Joseph Dixon Crucible Company, Jersey City, N. J., began its fifteenth year of existence. As a house organ in the interests of the Dixon products it has been eminently successful and gives promise of so continuing for a long time to come.

Perfection Mortise Machine Company, Columbus, Ohio, is the name of the concern which will hereafter manufacture the Improved Perfection Mortiser illustrated in these columns a short time since.

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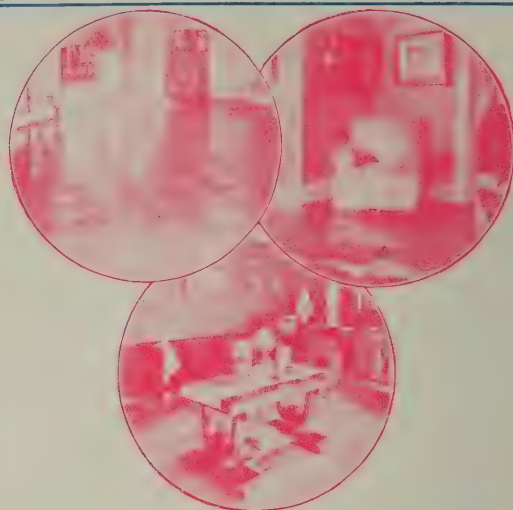
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THE BUILDING AGE

NEW YORK, MARCH, 1913

A COZY FRAME COTTAGE IN EASTERN MASSACHUSETTS

Unique Arrangement with Numerous Built-in Features—The Design
Typically Californian—Interior Is Finished in Cypress

THE cozy cottage type of dwelling which we here illustrate is typically Californian in its design, but is thoroughly Eastern in its equipment and finish. The half-tone engraving upon this page represents the house as it appeared when first erected, while upon the second page following we show it with the porch enclosed in glass for use as a sun parlor, the central picture on that page representing an interior view of

treatment of the living room and dining-room, while the varied assortment of details indicate the construction employed.

On the second floor are two sleeping rooms with ample closets, a commodious hall, several storerooms, and at the front is a sleeping balcony 10 x 11 ft. in size.

The foundation walls of the cottage are cement



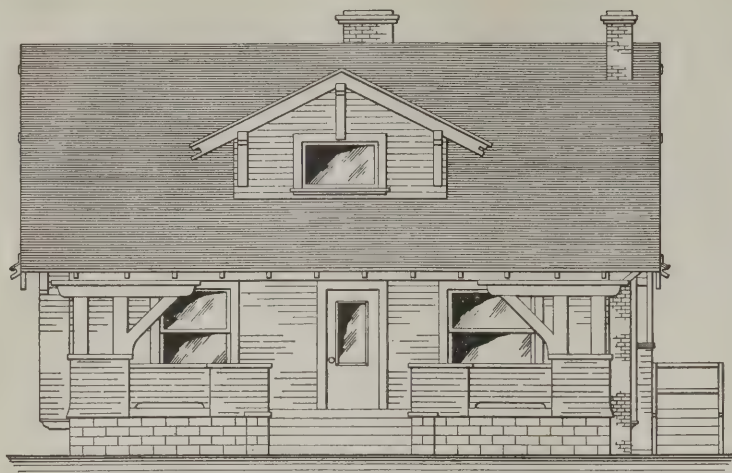
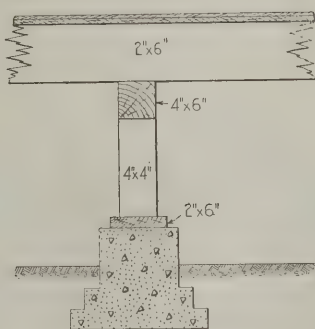
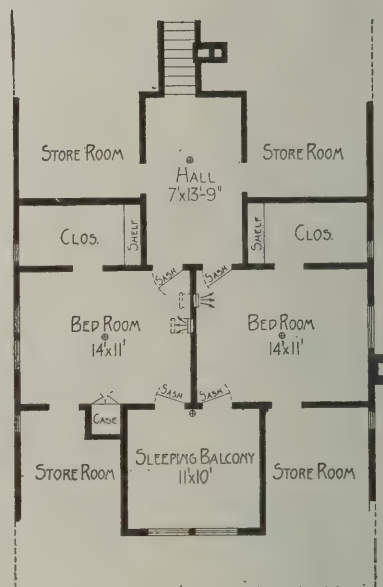
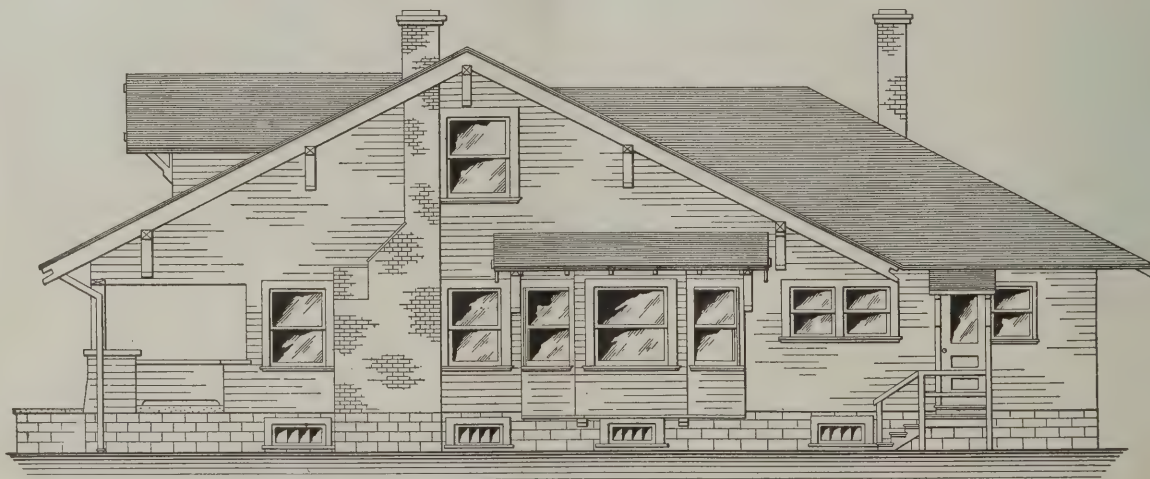
Photographic View of Cottage of Mr. A. B. Fitch at Sheffield Circle, Winchester, Mass.—Ernest McConnell, Architect, Los Angeles, Cal.

it. Some of the many points likely to attract more than passing notice are the numerous built-in features, including buffet, window seats, bookcases, cupboards, bins and medicine closet and California "cooler."

An inspection of the floor plans shows the first story to be divided into living-room, dining-room, den, two bedrooms, kitchen, breakfast room and bathroom, while at the rear is a screened porch. The half-tone engravings afford an excellent idea of the interior

blocks, the frame is of spruce, the sills being 6 x 8 in., the center girder 6 x 10 in., the floor joists 2 x 10 in., the ceiling timbers 2 x 6 in., the joists under partitions 4 x 10 in., the rafters 2 x 8 in. and the hip and valley rafters 3 x 10 in.

The window studs are 3 x 4 in. and the side studding 2 x 4 in. covered with matched North Carolina boards, over which is placed "Beaver" brand of sheathing paper. The outside walls, porch front and roof are

Front elevation—Scale $\frac{1}{8}$ in. to the footElevation of built-in buffet—Scale $\frac{1}{4}$ in. to the footMain floor plan—Scale $\frac{1}{16}$ in. to the footSection through line of girders at A-A of the foundation plan—Scale $\frac{1}{4}$ in. to the footPlan of second floor—Scale $\frac{1}{16}$ in. to the footSide (right) elevation—Scale $\frac{1}{8}$ in. to the foot

covered with Washington red cedar shingles as shown.

All brackets and outside finish is of cypress. The front porch and steps are of cement.

The interior of the house is finished throughout with A. T. Stearns cypress. The living-room has



View of the cottage after the porch had been enclosed with glass—Garage seen in the background at the left

beamed ceiling and is wainscoted 4 ft. high with leatherette panels, while the woodwork is stained to imitate Flemish oak. The large fireplace in the living-room, with seat on one side, is finished with mottled brick made by the Philadelphia & Boston Face Brick Company, 165 Milk street, Boston, Mass.

The dining-room is finished the same as the living-room, except the wainscot extends to the top of the doors.

The dining-room has a large built-in buffet with mirror and leaded glass doors with drawers underneath.

The cased opening between the living-room and the dining-room is finished with columns which rest upon bookcases and magazine racks with leaded glass doors, the whole of which serve as pedestals for the columns.

The "den" is finished in Mission style and has a hinged seat directly under the broad window, with bookcases each side.

The woodwork of the breakfast room and kitchen are finished natural, while the sleeping-rooms and bathroom are in white enamel.

The plastered walls are finished rough and tinted with water colors.

The floors of the living-room, dining-room and den are of quartered oak, while all other floors are of rift hard pine.

All plumbing fixtures are porcelain enameled and of the Standard Mfg. Company's make. Hot water for the kitchen, bathroom and laundry is supplied by a Humphreys Instantaneous water heater, using gas as a fuel.

The building is heated by means of an Ideal steam heater installed by the Bay State Heating Company Boston, Mass.

The cellar contains dust-proof coal bins and ash closet, also a coal closet, and has a large, airy laundry provided with two-part wash trays. The entire cellar ceiling and laundry walls are lathed and plastered. The cellar is said to be one of the finest in the place.

The cottage here illustrated was built by Elmer Buckley, 11 Amaranth avenue, Medford, Mass., for A. B. Fitch, of Sheffield Circle, Winchester, Mass.

The plans were drawn by Ernest McConnell, certificated architect for the Los Angeles Investment Company, 337 South Hill street, Los Angeles, Cal. Mr. McConnell states that such a house could be built in Los Angeles for \$3,200. Owing, however, to the greater cost of materials and labor in the East, as well as the fact that the house was built, finished and equipped for occupancy the year round in a colder climate, the actual cost was in excess of the figure named.

Making Doors in a Planing Mill

Looking at the construction of a door, it does not, at first glance, seem a very difficult proposition to make one. However,

when one comes in contact with this part of mill work it becomes apparent that it is not always quite such an easy matter. Especially is this true in a mill which does considerable jobbing. A writer in the *Woodworker* states that he has come across some very puzzling propositions in sizes. For example, somebody ordered a front door, say 3 ft. by 6 ft. 10 in., $1\frac{3}{4}$ in. thick, having one light 28 x 48 in. This person has seen a door



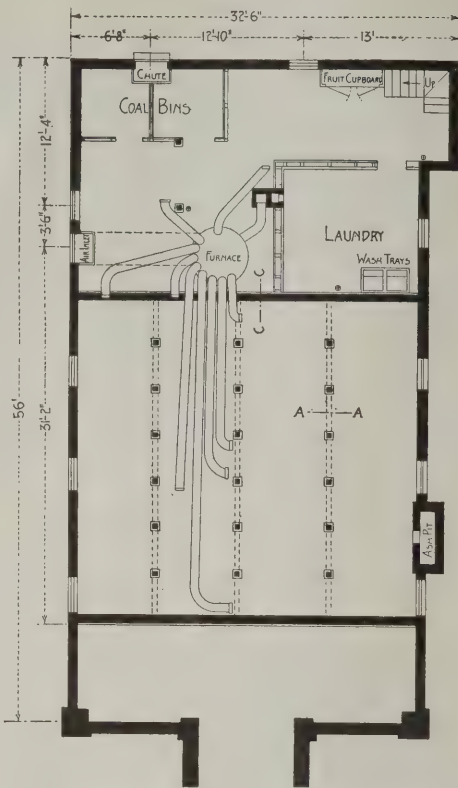
View in the enclosed porch utilized as a sun parlor



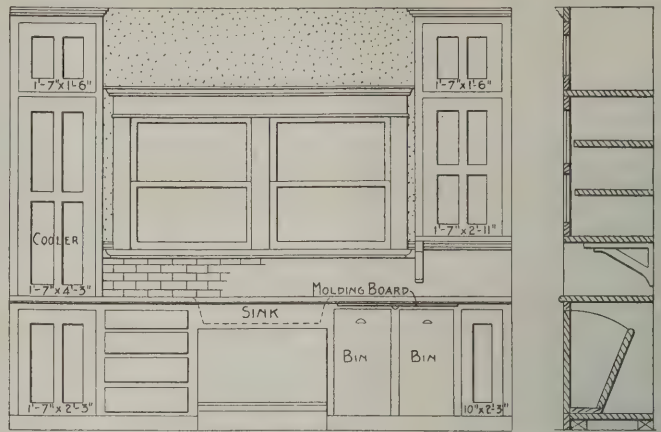
Another view of the house as it appears in winter

A Cozy Frame Cottage in Eastern Massachusetts

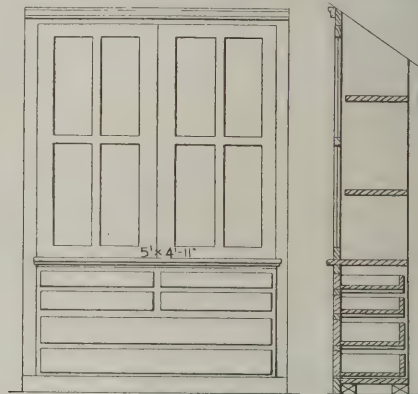
somewhere which has appealed to his taste, and therefore would like to have one like it. This is, of course, very reasonable if it were not for the fact that he did not take into consideration that the other door was higher than the one required. The door desired is to



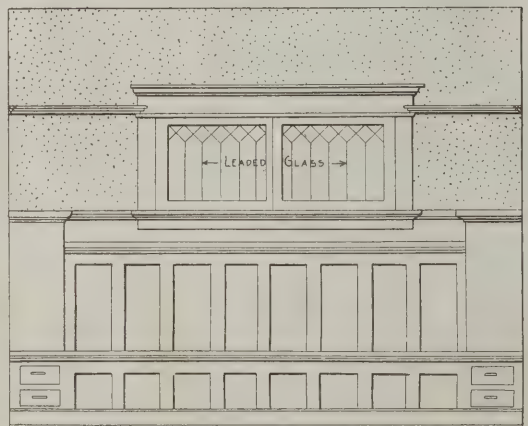
Foundation plan—Scale 1/16 in. to the foot



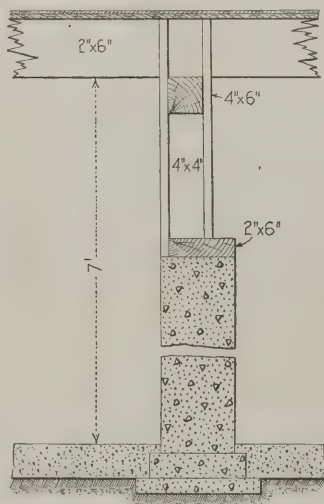
View in kitchen, looking toward the sink—Scale 3/8 in. to the foot



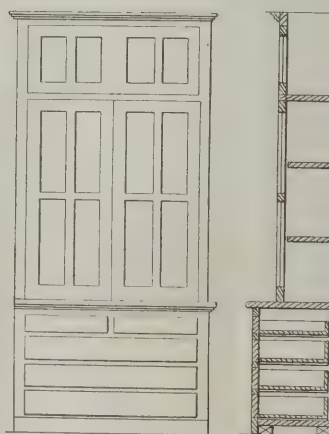
Elevation and section of linen closet—Scale 3/8 in. to the foot



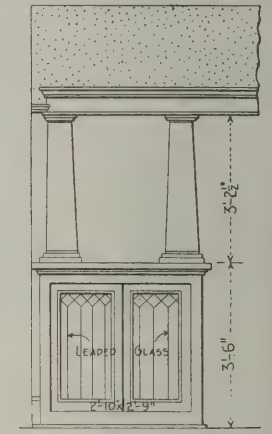
Side of "Den," looking toward divan and bookcases—Scale 1/4 in. to the foot



Section of foundation walls on line C-C of the plan—Scale 1/16 in. to the foot



Elevation and section of bathroom cupboard—Scale 3/8 in. to the foot



Partial elevation of living room side of cased opening to dining room—Scale 3/8 in. to the foot



Side of living room, looking toward mantel fireplace and seat—Scale 1/4 in. to the foot

have one panel at the top and one at the bottom. A door which is not higher than 6 ft. 10 in. will not allow of a cross-panel at the top, for the reason that the upper panel would obstruct the view; the distance from the top to the glass should not be less than 15 in. It is

subject in such a way as to properly do the work.

Another error, which may occur with almost any carpenter, is in ordering a number of doors of the five-panel arrangement now very extensively used. Among these there may be some which are only 20 in. wide.

It will be apparent at once to the door man that this width will not allow of a five-panel arrangement, but should be three panels, such doors being of the same height as the five-panel doors.

It is not practical to make a five-panel door less in width than 22 in., in order to harmonize with the others, whose stiles are $4\frac{1}{2}$ inches wide, as a rule. In trying to make a five-panel stile for a door which is only 20 inches wide, we find that the two stiles and the mullion added together make $13\frac{1}{2}$ inches, leaving only $6\frac{1}{2}$ inches for two panels, which would look very bad, to say the least.

The glass sizes for five-panel doors are always standard, being 34 in. high for 6—8, 36 in. for a 6—10, and so on; these sizes are always adhered to in our mill. By cutting out the upper two panels and mullion, it is very easy to convert a five-panel door into a front or rear door with one light.

Another variety of door is the four-panel style, also used quite often. In this the top rail is the same width as the stiles, the middle and bottom rails being 5 in. wide. The distance from the bottom to the top of lock rail is three feet—that is, to the plow—so that in case the door should be changed to have glass in the upper part, it would leave a regular size opening for the



A Cozy Frame Cottage in Eastern Massachusetts—The Dining Room as Viewed from the Living Room

evident then that the top panel must be cut out. The width of the glass desired being 28 in. and the door being 36 in., would only allow of 4-in. wide stiles, which is not enough for a front door, because it will not allow of a heavy lock being used. The stock for front door stiles should not be less than 5-in. width.

In this case all kinds of trouble have developed in the making of this door, because the party ordering was not conversant with the requirements. It appears, therefore, that the making of a door is some trouble after all. Of course, the door could be made as ordered, but no end of difficulty would develop if it were so made, and the mill man would be blamed for it. This is not an exceptional case, for it has often come under my observation.

There are several things, therefore, which must be taken into consideration in the making of a front door, most important of which are, do not bring the upper panel below the line of vision, nor make the stiles less than five inches wide from the glass line.

Another case which happens often is where the glass size is given in height, and also the panel arrangement, and when you start to lay off you find that the size of the glass is too long for the required panel effect. Of course, these difficulties will not arise so easily if one takes the order who understands the requirements thoroughly, but the trouble arises from the fact that the order may have been sent by letter from somebody who does not understand the sub-



View in the Living Room, Looking Toward the Open Fireplace and Mantel

glass. Of course, it sometimes happens that a door is to be of an uneven height, in which case the lock rail should be changed to allow of a regular size glass being used. However, these cases do not often happen.

In making a five-cross-panel door the rails are of the same width as the stiles, except the bottom rail, which

is usually 9 in. wide. The panels in a cross-panel door we usually make of a uniform width. If a one-light door is required in this style, we usually take out the upper two or three panels, and if this gives an uneven size glass, the panels are laid out so as to make the glass size even. This slight deviation in height will not be noticed among the other doors.

Dresser doors, or any of the smaller kinds, are also a troublesome proposition because of the many odd sizes that are required. There is a certain rule in making these small doors, to which one always adheres unless there is a detail requiring a certain arrangement. If a door is 18 in. or wider, we make it two panels in width; if 17 in. or less, one panel in width, using 3-in. stiles, top and middle rail and mullion, and a 6-in. bottom rail. If a door is 3 ft. high or less, one panel in height is used. If it is over 3 ft. in height, we make it two panels high, placing the middle rail from the center down.

The sliding door, usually used between two rooms, is the next problem, and is also somewhat difficult because the various contractors have different rules in studding up for these doors, and the man who measures up for the mill is sometimes in doubt as to how wide he should make the stile which goes into the partition, also the head rail.

In case of the double sliding door we make the back stile and top rail one-half inch wider than the meeting stile. In the single sliding door both stiles and top rail are made one-half inch wider, so that when the door is closed it shows the same width of stock all around.

Last, but not least by any means, comes the batten door, the kind usually used for the outside of factories, stables, etc. Of these there are also different styles of construction. In many cases we make the frames of 1½-in. stock and the backing of beaded boards. If the door is 3 ft. wide or less the beaded boards are put on vertically and no braces are used. If wider than 3 ft. the braces are used. In case of a double door there is only one brace used in each panel, the highest point toward the center of the doors, so as to bear the weight and prevent sagging. Often the beaded back is put on diagonally, which makes a very strong door.

Then there is the shop door, made of 1¾-in. stock, with beaded panels placed in the center in a plow. These doors should be made with the lock rail placed 3 ft. 6 in. from the bottom up, the stiles and top rail being 6 in. and the bottom and lock rails 9 in. in width. The braces are usually made 4½ in. wide, and this rule we always follow where there is no detail given. Of course, if the doors are very large, everything is made larger in proportion, the stiles sometimes being 12 in. to 14 in. wide. This, however, does not often occur except in railroad jobs for roundhouses. The railroad company usually furnishes details for these doors, which must be closely adhered to.

Another kind of shop door, and one which is very often used, is the kind with a number of small lights in the upper part. A cheap way, and also very satisfactory one, is to frame the lights up of mullions which are of thinner stock than the door. For instance, if the door is to be 1¾ in. thick, we use 1½-in. stock for the glass frame. Another method is to make a sash which is raised the same as a panel and made to fit into a plow; but this is more expensive than the first.

The Barge office, which for some years has been a well-known landmark at the Battery on the Island of Manhattan, is to be replaced by a new structure to cost approximately half a million dollars and to be used jointly by the Customs and Immigration Service. The plans call for a two-story brick building in the Spanish style of architecture with a roof of red tile.

Report on Building Operations in New York City in 1911

We have just received from Rudolph P. Miller, superintendent of the Bureau of Buildings for the Borough of Manhattan, New York, a bound copy of the report of the Bureau for the year ending December 31, 1911. The information presented is of a most interesting and valuable nature, being comprehensive in its scope and covering every detail of the work of the department, with tables showing building operations in Manhattan as well as for the entire city. Comparing the building operations for 1911 with those for 1910 the Borough of Manhattan shows an increase of 2.4 per cent.; the Bronx a decrease of 46.3 per cent.; Brooklyn a decrease of 5.1 per cent.; Queens an increase of 44.8 per cent., and Richmond a decrease of 30.1 per cent., making a decrease of 6.7 per cent. for the entire city.

In discussing the character of the construction work in Manhattan the report states that of the 766 structures for which plans were filed in 1911, those which were to be fireproof amounted to 39.42 per cent., while 45.18 per cent. were to be of ordinary construction; that is, of brick or stone exterior walls with wooden joists for the floor construction. The balance, 15.40 per cent., were to be of miscellaneous construction. The analysis of the figures clearly indicates that fireproof construction is rapidly increasing.

During the year covered by the report 1078 buildings were demolished as compared with 1072 in 1910 and 1127 in 1909. The year of greatest activity was 1903, when 2330 buildings were demolished for various reasons.

Outlook for the Sheet Metal Business

In discussing the outlook for the sheet metal business and comparing present conditions with those which existed in the recent past Park B. Doing, of the firm of Miller & Doing, makers of architectural sheet metal ornaments, statuary, etc., 39 to 43 York street, Brooklyn, N. Y., expresses the following views:

We are convinced that business conditions in the sheet metal line show a marked improvement in many respects over those prevailing a year ago. There has been a gratifying increase in the volume of business, and although this has been the case from year to year during the past 20 years, the percentage of increase in 1912 over that of 1911 was greater than ever before. Contract prices for special or modeled work during the past year have been somewhat greater than those of the year before. However, when the greater cost of raw material, etc., is taken into account, I would say there has been no increase in the prices of our product.

Our factory was operated to its fullest extent during 1912—a somewhat better showing than the previous year—and at the present time we are unable to make deliveries on special or modeled work as promptly as we could wish. We have experienced some difficulty in securing a sufficient supply of skilled labor for our requirements, due, however, mainly to the scarcity of mechanics and artisans skilled in our line.

The prospects for an increased volume of business during the ensuing year are bright and we feel very optimistic on that score. We have made several important additions to our equipment during the past year and are at this time engaged in installing electric power throughout the plant to take the place of steam power and will make several improvements preparatory to handling the anticipated increased volume of business.

In sharpening plane irons and chisels always rub on the bevel and never on the back, as this must be perfectly straight to insure perfection in cutting.



Front View of the Philippine General Hospital of Reinforced Concrete Construction and with Shell Windows

PHILIPPINE HOUSES WITH SEA SHELL WINDOWS

Decorative Effects Possible with the Kapas Pearly Translucent Shell from Philippine Waters—Universal Use of the Shells in Manila Buildings

IMAGINE a house window of 250 panes, each pane but little more than 2 in. square, formed of a thin translucent shell, through the delicate silver grayness of which the un pitying blaze of the slanting sun filters, softened and gentle. It might be the window of a palace of some fairy princess, a magic casement opening on the foam of perilous seas, or a lattice through which leans young Madeline.

To be really practical, it is almost any window in almost any house in Manila, losing nothing of the romantic, for Manila is still the abode of romance—the city that was made for the Spaniards, against the huge embattlements of which pirates and rovers hurled their armies; whose people heard and feared the name of Francis Drake; the city that was taken and sacked by the men of the John Company; the city that knew the reign of terror of 1896, saw the execution of the patriot Rizal, and—romance upon romance—saw the coming of the American and the dawn of new and better things.

The shell windows of Manila that have seen so much—in some of the old churches of the city they are still serviceable after more than a century of sun and typhoon—are as inevitable and effective in their

surroundings as is the keystone in the arch. They have a duty different from the superb plate glass of Fifth avenue, New York, and appropriateness beyond the paper shoji of Japan, a durability as great as the

diamond panes of Elizabethan days and withal qualities, like that pearly translucence, the chief of their charms, which are special and appealing.

They may be seen all over the Philippines, but nowhere as in Manila. It is a reasonable estimate that the city uses 5,000,000 of the shells each year, for in 1910 the tally of a single company was 1,500,000. What are they? From whence and how do they come? There are hundreds of Americans and Europeans who, living in the islands, yet have the vague idea that they are the slab split off from some larger shell, which is not the case. The Kapas, or window shell mol-



Main Entrance to Philippine General Hospital, Manila, showing Window Sashes Fitted with the Kapas Translucent Shell and Sunlight Effect on Inner Side

lusc, is as individual as it most certainly is beautiful.

It is widely distributed through the Philippines in certain definite areas, and the shell is always fished for alone, never for the pearl which it sometimes contains. Manila Bay, especially its shallow arm east of Cavite, holds a large bed, and Kawit is the center of activity for this fishing. Iloilo sends up large quantities to

the Manila market, and from Bohal, Negros, Masbate, Mindanao and other islands south of Luzon it also comes. It may be found generally in shallow water and when young such is its transparency that its very functions may be observed. It takes three years to mature, the opacity of the shell increasing with age.



Philippine Houses with Sea Shell Windows—A Kapas Shell, $4\frac{3}{4} \times 4\frac{1}{2}$ in.

Thin and flat with a rounded outline, the shell is not unlike a large wafer. Mature, and as it comes to market, it is about 1 centimeter in thickness by 14 centimeters in diameter. Its left valve is slightly convex, the right is flat, and it is this right side which is transformed into a window pane by squaring off the edges in a rude machine, such as is used for cutting plug tobacco, or even, what is often done, by clipping with a big pair of scissors.

The strength of the shell is a matter for wonder. At the Bureau of Science of the Philippine Government some Cavite specimens were submitted to rigid tests in competition with glass, a scientific dropping of weights upon one and the other, until the breaking point was reached. Whereas glass of 2 millimeters in thickness broke at the first test and glass of 3 millimeters at the second, Cavite shells but 1.1 millimeters thick withstood the dropping, the weakest 390 times, and the strongest 1500 times.

The shells lie in the beds of Manila Bay in shallow water and, with the embarrassment of riches which the wonderful variety of marine life found there offers to the fisherman, the cultivation of the oyster and the window shell is carried on simultaneously by many. These men stake off their beds as a miner stakes a claim, and when, in fishing outside the claims, they come upon small and half grown window shells, they gather and plant them on their beds, there to remain until they are mature, for the small shell, unfitted for window use, cannot be sold. This occasional gathering with fishing for the market and supplying the beds with spat, spawn of shell fish, that cloud of living dust which is thrown out by the mollusc in due season, is all the life of the fisherman.

His fishing is intermittent, for it is not his nature to work steadily. A brisk demand may stimulate him to exertions beyond the ordinary, but for the most part he is industrious in exact relation to his need of ready cash. He and his fellows club together and hire a watchman, whose duty it is to guard their claims from

poachers and other ills of whatever nature, and in a house built out over the water this functionary lives.

But when need or a rare spirit of enterprise calls his employers out, they will be found not without their special skill. Alvin Seale, the young scientist, who is making a life study of the marine products of the Philippines, secured but 35 shells in one hour of fishing, while in 10 minutes the owner of one of the planted beds took out 100 adult shells for him. These men fish the shells at low tide in water of 3 ft. or less in depth, feeling for them either with their toes or their hands, as the fancy takes them. The yield of the Cavite bed is estimated at 14,000 adult shells for a good week's fishing.

India knows the shell also, but there they must dive for it, whereas the supply in the Philippines is so large that in no place has this been found necessary. There are no laws regulating the gathering of Kapas, nor, it must be admitted, has there yet arisen any necessity for restrictive regulations. The price they fetch on the market varies with their size. Shells that will square 2.5 in. sell for \$1.50 to \$3.50 per thousand, while large ones, which will square 3 in., command \$4 to \$5 for the same quantity. Let the American read, reflect and inwardly digest this, however: one fisherman explained to Alvin Seale that he had three prices for the first grade shells, \$4 per 1000 to Filipinos, \$5 for Spaniards and \$6 per 1000 to Americans. More by token, the Chinese trader, for John Chinaman intervenes in this as in all else, will not hesitate to ask \$8 per 1000 of the amateur buyer. The shells are usually sold in large baskets, each holding 10,000.

The rare beauty of these shells, set in their grooved strips of wood within the solid frame of a window, would be difficult to describe. In the old churches of the city and in the superb new structures which are the outward signs of that American enterprise which is making a new Manila, they can be seen at their best. There is yet no export of these shells worthy the name, the only shipment recorded last year



The Elks' Club at Manila with Its Shell Windows

being 1500 kilograms to New York from Idaho.

The builders of bungalows in the United States and notably in California cannot long overlook a window material which is at once stronger, cheaper and more attractive than glass, nor can the manufacturers of such articles as screens, veranda lights and the like afford much longer to pass the Kapas by. They promise to come into their heritage in due season.

The Gargoyle Club is the name of a new organization composed of leading St. Paul architects.

COMMENTS ON COST OF RESIDENCE CONSTRUCTION

What a Well-known Architect Has to Say About Building a House of Moderate Cost—Kind of Materials Used and Prices in Different Localities

IN no branch of building is the unit price more difficult of accurate assumption than in residence work. Not only is cost largely influenced by *locality*, including the local material market, wage scales, working hours and efficiency of mechanics, but it varies with the type

of plan and design, while the character of construction and materials remain unchanged.

If the cost be estimated according to cubage for a certain construction and finish, it may be modified by per-



centage factors to determine roughly the cost of different materials, workmanship or equipment.

The larger and more elaborate the house, the more difficult it becomes to assume a cubic foot price, says Robert C. Spencer, Jr., in a recent issue of the *Architectural Record*. For the house of moderate cost, however, fairly trustworthy data can be given, remembering that they vary with locality, size and construction, and that the tendency of all forms of *wood* construction and *wood* finish it to *gradually increase* as our forests continue to dwindle.

Twenty years ago good small frame houses were being erected in Chicago's fashionable suburbs at *seven and eight cents a cubic foot*. The same houses 'now cost more than double. Five years ago a good frame and stucco house costing ten to fifteen thousand could be built in our western suburbs at seventeen cents, but would now cost twenty—probably more. The same type in our more expensive and remote North Shore suburbs would average about twenty-two cents.

A few years ago solid brick walled and shingle-roofed houses of good size could be built at twenty-five cents. The price of brick has since increased materially, and local wage scales are higher, with wood framing, floors and finish more expensive. Each year, too, the standard of quality demanded is higher, particularly in the matter of equipment. Wiring for electric lighting, formerly largely done in the cheapest way—is now run in metal conduits. The bathroom floors must be of tile instead of wood. Piping for vacuum cleaning must be installed, and maids' quarters must offer the equivalent of good hotel accommodations, so acute has grown the servant problem. The old-fashioned, wide open porch is now a sort of overwindowed annex to the living room and must not only be glazed with sliding or casement sash, but provided with enough radiation to render it livable all winter. When ten years ago there would have been no stable or other outbuildings, there is now a small garage.

For small frame houses, wide, sound, tight, stained, lapped, knotted boards, ship-lap or boards tongued with rebated battens to shed rain are the most economical exterior covering over sheathing and waterproof building paper or "quilt."

Shingles have nearly doubled in cost in the past twenty years, but still cost no more than the thin, painted, lapped "siding" or "clap-boards" which for

more than a century have been the standard covering for the American frame house. Hard, painfully neat, thin and flimsy looking, without variety of color or texture, and requiring paint every few years to prevent a worn and shabby appearance—they have seen their day. In the long run, if of clear lumber and counting the cost of frequent repainting over the life-period of the average house, they are no cheaper than stucco on metal lath.

Simple brick houses will average not more than 20 per cent. more than frame and "stucco."

Combination Brick and Stucco Houses

The combination wall of brick for the first story and stucco or stucco and stained wood above will cost usually nearly as much as the all-brick building, but has a picturesque and lively quality, which renders it suitable to some sites, while the frame walls of the second-story may be readily extended in the form of bays, overhangs, or upper porches, allowing greater freedom in planning the upper floors.

In some localities where gravel or crushed stone is close at hand, hollow cement block for outer walls, including foundations, compete in cost with ordinary frame construction, but are unsightly unless cast without facing and the walls "rough-casted" all over. Hollow terra cotta blocks similar to those used for the partitions of fireproof buildings take and hold cement rough casting well, but the cost is so variable at the present time that the writer would hesitate to name a cubic foot price for the Chicago suburbs with which he is familiar. For the construction of a simple, square cottage costing \$3,500 at Concord, Mass., the architect states that it cost but 8 per cent. more than a shingled frame wall construction, according to bids received.

Our own practice recently indicated on a \$15,000 hollow tile and stucco finished house (the work being done largely by day labor and bids having been received for the same house in frame and stucco) that 3 cents a foot added to 23 cents for the latter covered the difference in cost.

In any locality where this type is new and unfamiliar only comparative bids on two sets of plans for the same house will clearly show the difference. To a certain extent this also applies to other materials, but is particularly true of hollow tile at the present time.

It is not advisable to dispense with wood furring and lath for the inside of exterior tile walls. The 26 cent house had no furring or lath. The furring will almost save its cost in the labor of cutting for pipes, conduits, etc., but the lath, preferably metal, is, of course, an added expense.

Cost of Tile Houses

We have had tile cottages built as low as 15 cents, and I quote Lawrence Buck's published statement that his own charming story and a half hollow tile walled house at Ravinia cost but 18 cents, including a roof of heavy interlocking red tile.

Brick veneered houses are warm and durable, and in most localities cost somewhere between the price of frame and solid brick. On one \$8,000 house we found a saving on comparative bids of only \$100 in favor of brick veneers, so naturally used solid brick.

Stone is seldom used for wall construction in the

house of moderate cost, although in many localities, it will compare closely in price with brick.

The cost of foundation material is decidedly a local question as between brick, rubble stone or concrete. For a small house hollow tile or hollow concrete blocks are strong enough and sometimes cheaper.

The cost of a good shingle roof covering is roughly from 7 to 8 cents a square foot, or \$7 to \$8 a square, as builders estimate it. Shingle tile are worth from \$16 to \$20 a square, including trimming and flashing depending upon the character and size of the surfaces to be covered. Slate costs somewhat less—varying with quality and surface exposed to weather.

None of the cubic foot costs enumerated make allowance either for architects' fees or the work which must be done upon the grounds about the house.

And in attempting to use them to wet-blanket your hopes for that ideal little house, please remember that prices vary with locality, with building activity and with *design* as well as with materials, and that you will in the end have to pay not always merely what it actually costs your several contractors to do the work, plus a fair profit for their time and pains, but whatever the lowest trustworthy bidder equipped to do work in your particular locality is willing to accept, and that sometimes, if he is very busy, he wants a stiff premium for his services, unless you are willing to wait until his work is "slack."

Also remember that in the country and in small towns, ordinary builders' work, particularly carpentry, plastering, painting, etc., is from 10 per cent. to 25 per cent. cheaper than in large cities and suburbs.

The Death of I. A. Mekeel

I. A. Mekeel, vice-president of the David Williams Company, died on Sunday, February 2, at the East Orange, N. J., home of D. B. Caldwell, president of the Wells-Fargo Express Company. He had been stricken just a week before with indigestion so acute as to affect the heart and had continued in such a condition that he could not be removed to his own home in Montclair, N. J.

Mr. Mekeel was born in Clinton, Iowa, September 25, 1870, the son of George M. and Maria Haviland Mekeel. He was educated at the Friends' Academy at Union Springs, N. Y., and at the age of 17 taught school near that town. Two years later he removed to St. Louis and connected himself with his brother, the owner of Mekeel's Weekly Stamp News, a paper published in the interest of philately. He gave proof of the business ability which afterward became so marked when at 21 he went to Europe to effect the sale of rare stamps. Subsequently he became the owner of Mekeel's Weekly, which is now published in Boston, and in which he was interested up to the time of his death.

Mr. Mekeel connected himself with the Textile Publishing Company in 1900 as a solicitor on the Dry Goods Economist in the New York market. In about a year he was appointed one of the special representatives not only of the Economist but also of its allied papers in the Root Newspaper Association. So successful was he in this work that in 1904 he was elected a director and secretary of the Textile Publishing Company and treasurer and general manager of the Root Newspaper Association.

On May 1, 1911, principally through the work of Mr. Mekeel, there were brought together, under the name of the United Publishers Corporation, a large number of prominent technical and business papers, including *The Building Age*, *The Iron Age*, *Iron Age-Hardware* and the *Metal Worker*, *Plumber* and *Steam Fitter*. Of this parent corporation Mr. Mekeel became vice-presi-

dent and treasurer. He was also an officer in a number of other publishing and printing companies.

Mr. Mekeel married on October 29, 1896, Elizabeth M. Schureman of St. Louis. He is survived by Mrs. Mekeel and three young sons, by his aged father and by two brothers, one of whom, G. D. Mekeel, is president of the Commercial Bulletin Company, publisher of the Twin City Commercial Bulletin.

Mr. Mekeel's sudden death in the prime of life, and when he seemed to be at the zenith of his powers, is mourned by a great number of business and social friends. He was well known in many centers other than New York and St. Louis, among these being Boston, Chicago, Minneapolis and St. Paul, and wherever known he was admired and respected. Of splendid physique, highly attractive personality and apparently unbounded vigor and energy, he won all with whom he came into contact. His shrewd business sense, though always at his command, never warped or unduly influenced his mental breadth or lessened his sterling qualities, derived from a Quaker ancestry. He was a magnificent example of the highest American type—full



I. A. Mekeel

of life, of humor, of comradeship, and yet ever intent on the interests of the great business to which he had dedicated his career and in behalf of which he spent himself with all too great devotion.

To all of his immediate business associates he was more than a fellow-worker. To have known him, to have worked with him, is much; but to have had him as a friend is more. And it was as a friend, a loved and valued friend, that his associates most deeply mourn him.

Sand Blast for Testing Building Materials

The cutting and wearing power of a stream of blown sand, long since utilized for various purposes, has been employed for testing building materials at the Gross Lichterfelde Institute in Germany, says the *Engineer*. Granite, pine wood, linoleum, and other substances used in construction and furnishing of buildings are subjected for about two minutes to the action of a blast of fine quartz sand, under a pressure of two atmospheres. The results show the resisting powers of the substances, tested to the effects of wear. This form of test is also applicable to road-building materials.

CABINET WORK FOR THE CARPENTER—III.

China Cabinets and Tea Cart—Certain Well Established Needs—
Great Help to the Housewife

By PAUL D. OTTER



EVERY frequently provision for placing and displaying choice table ware, and cut glass in the built-in sideboard is inadequate, and also without proper light to show to good advantage the features of some newly acquired bit, for it is well-known that a woman is about as eager for a new plate or bowl as a boy is to acquire some strange foreign postage stamps to add to his collection. The chief aim then will be to have the parts trimmed down as light as possible consistent with strength, for there should be no great barrier of framed woodwork to obstruct the view; rather will it

side edge is rabbeted to take a good grade of single thick glass, and deep enough to allow the glass to be set in with a neat $\frac{1}{4}$ or $\frac{3}{16}$ -in. square strip instead of putty. The filling of back frames, shown in Figs. 1, 2 and 3, may be of well-selected tongued and grooved material, or some of the new brands of composition board may be covered with veneer paper, if a regular laid up veneer panel cannot be conveniently secured. The shelves can be fixed permanently at even spacing or frequent holes bored on the inside of the frames into which the little metal shelf rests may be used as in bookcases.

In laying out a preparatory drawing for Fig. 2, con-

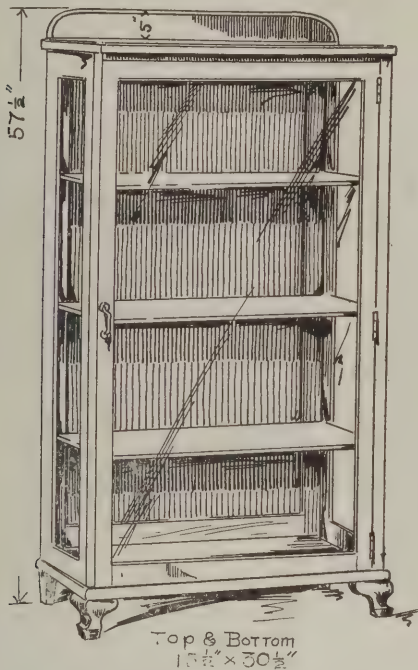


Fig. 1—One Form of China Cabinet



Fig. 2—Another Style of China Cabinet

Cabinet Work for the Carpenter—III. By Paul D. Otter

be a set of frames set up in case-like form containing well-selected sheets of glass; in fact, many cabinets have the shelves of $\frac{5}{16}$ -in. plate glass, which adds much to the display of cut glass ware, and in place of the plain paneling of the back filling, a full sheet of mirror is often used to apparently multiply and add to the brilliancy of the displayed ware.

Fig. 1 consists of practically four frames, the sides and back being blind screwed to a top and bottom board each $15\frac{1}{2} \times 30\frac{1}{2} \times \frac{7}{8}$ in. and a finished panel 5 in. wide fitted on the back edge as shown. The entire case is raised on a simple form of squat cabriole leg in front, obtained from a block $4\frac{1}{2}$ in. square, sawed out in shape as suggested from a pattern made from your drawing. The back foot is $4\frac{1}{2}$ in. long by 2 in. square, slightly tapered. Both feet are attached by two dowels each, set in glue and further fortified by corner blocks placed in back where they will not show.

Before the door has been laid out on your drawing, allow for a $\frac{5}{8}$ -in. wide strip set in under the top board. All these frames may be made up to have a finished size of stiles and rails of $\frac{3}{4} \times 2$ in. The in-

sider that the top and bottom board is secured by four $1\frac{1}{2}$ in. square posts placed within 17×40 in. The back post it will be observed, sets under the top shelf and the front slightly projects above. Place on the ends a 3-in. cross-rail under the top shelf and in front of the lower shelf, while a $2\frac{1}{2}$ -in. apron goes across in front of bottom board, and under doors.

Before provision is made for the shelves, $\frac{1}{4}$ -in. strips are glued and secured with headless brads to the inside of the posts at the side, against which the side glass is set in and held on the other side by $\frac{1}{4}$ -in. strips, also invisibly secured by glue and brads. The front doors have a full sheet of glass up to the mul-lion under the glass panel divisions. The top rail cut out in the three-arch manner may have one piece of glass set in across and behind the two divisions, if it is found difficult to cut the glass to the round shape, although an ordinary ten-cent glass cutter will readily cut this. The cutter is run around a stiff pasteboard pattern with a firm hand and then tapped from the back of the glass until it is severed. Material $\frac{3}{4}$ -in. thick is used for doors, top and bottom to be $\frac{7}{8}$ in.,

while the shelves may be $\frac{5}{8}$ or $\frac{3}{4}$ in. thick, well dried.

Fig. 3 will be found to ve a very dainty shape in the size given—15 x 24 in.—but this width may be doubled if the style is desired for a more roomy cabinet. This size will be found more effective than a larger cabinet oftentimes when placed in a certain wall jamb or put diagonally in a corner. This, too is built somewhat in the same manner as Fig. 2 within four $1\frac{1}{2}$ -in. square posts, except it has a $3\frac{1}{2}$ -in. apron framing under the top finished between posts by some simple suitable molding as suggested, the apron to be set $\frac{1}{4}$ in. back from face of posts. The back frame and front door frame is made of $\frac{3}{4}$ x 2 in. material for stiles and bottom rail and in your drawing plan to make the top rail a full half circle with sun ray effect as shown, the strips or ribs having an exposed width for this interior froming of $\frac{1}{2}$ in. The larger and lower part of door consisting of three long divisions of glass

This door treatment is an easy suggestion of many modifications that can be given which are now so popular, influenced greatly by the practice of Chippendale, and later so much used by Colonial cabinet workers. An arched top rail may be made for the

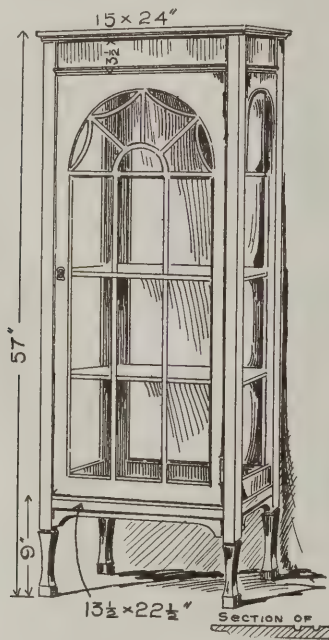


Fig. 3—A Dainty Pattern of Cabinet

Cabinet Work for the Carpenter—III.—By Paul D. Otter

sides to conform to the arch of the front, leaving out the grille work. To reduce the cost of a full mirror back panel, if mirrors are desired, the back framing may be divided by cross rails which are spaced to go back of the shelf divisions, and four mirrors may occupy the place of the usual wood paneling.

In order to reduce the thickness of shelf edges without reducing the thickness, mold the ends and front edges with a wide ogee mold, which when adjusted in place, molded side down, resting on shelf supports, cause them to have a very light appearance. Provide also on the upper side of shelves two well-cut grooves one 1 in. and the other 2 in. from the back edge. These are to stand plates on edge, preventing them from falling. The new style of cabinet door handle will be the proper thing for such cabinets, consisting of a plain half hoop brass handle with a small thumb knob above, which when pressed in, releases a positive spring catch. This is more to be desired than escutcheon knob and key.

It is not so very many years ago that if real "plain folks" were seen using a tea cart they would be regarded by certain neighbors as "putting on airs" or

getting "tony." Considering the many articles which have heretofore been classed among the luxuries of life the tea cart when used will be found to greatly lighten the labors of the housewife, particularly if she is attempting much or all of the labors of the home. From the kitchen many meals may be carried entire, while there will be a great reduction in the labor of removing the dishes and at the same time it gives the housewife greater composure at the table that her dessert prepared before the meal needs only to be wheeled to her place at the table by some other member of the household.

This is one of the many items of conserved energy which our women are adopting and it will not be long before few homes will be without a tea cart, and where the outdoor life on porch and lawn is being given so much attention the tea luncheon is readily carried about on the cart wherever desired.

In Fig. 4 is shown a tea cart which provides ample space for the needs of an average family. It may be found on looking over this illustration that it would

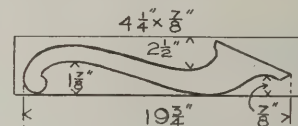


Fig. 5—Detail of One of the Pusher Supports

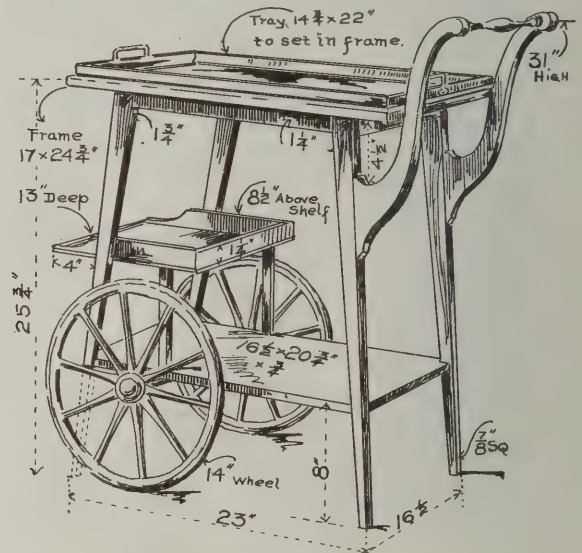


Fig. 4—Details of a Modern Tea Cart

be desirable to provide other features. Some have a knife box arranged under the tray between the handles, but whatever these additions may be, aim to embody them in the preparatory detail drawing which should always be made. This drawing does not need to be elaborately detailed, as the main thing is to obtain the constructional outlines or boundaries and whatever bevels will be required to know; also to draw any part of the varying forms, such as the pusher supports, shown in Fig. 5 that it came from a board $\frac{7}{8}$ x $4\frac{1}{4}$ x $19\frac{3}{4}$ in., then trace this on a heavy piece of paper, so that it can be cut out to the mark on the prepared board for sawing out, the two being sawed out together if done on a band saw.

Considering that the removable tray on top is made first we will proceed to construct the cart to hold it. The tray having an outside measurement of $14\frac{3}{4}$ x 22 in. sets in another frame 17 x $24\frac{3}{4}$ in. which is screwed to the frame of the cart through the under side of the side rails, the end rails providing a resting place for the tray. The plan of the rails and four posts of the cart will be found to be $16\frac{1}{2}$ x 15 in. This detail being known it will not be difficult to pro-

ceed with drawing up the rest of the cart from the measurements given.

See Fig. 8 on page 568 of the November issue of *The Building Age* for 1912 and the description relating thereto on pages 569 and 570.

The wheels may be made in several ways but the form constructed after the manner of a wagon wheel will give the greatest satisfaction. A drawing should be made of this. The diameter of the wheel for this cart is 14 in., including $\frac{1}{2}$ -in. rubber tire such as is used on a child's carriage. This tire is not absolutely essential and I mention this in case it is not readily obtainable. A piece of very heavy felt or flat band of rubber glued on neatly in a similar manner to the rubber on a band saw wheel will answer. The felloe should be not less than $\frac{5}{8}$ in. in tread and $\frac{3}{4}$ in. wide jointed in the same manner as in a wagon wheel.

The spokes are worked to an oval and round shape from a $\frac{5}{8}$ -in. square and are fitted into a $2\frac{1}{4}$ -in. hub with a long tenon. Avoid turning the hub of a pattern which will project too greatly on the outside of the wheel as it should be just a low round to avoid striking the door jambs. Have the journal bearing in the hub bored and counter-bored to receive the nut on the axle in a flush manner. The axle which is held by screws to the bottom of the under shelf should be $\frac{5}{8}$ in. square with a $2\frac{1}{2}$ -in. journal and proper washers at each end of the hub.

The wheels should represent careful workmanship and if it is possible have them so that they can readily be detached by a spring catch on the axle and an inserted flange bushing within the hub rather than the old style of threaded axle and nut which too frequently allows grease to collect on the outside of the hub.

The new "steel glides" or "domes of silence" will be found very smooth terminations driven in on the bottom of the front legs. These are now largely supplanting the unsightly and objectionable casters on most all kinds of light furniture.

Portable Schoolhouses for New York City

In order to provide additional school room facilities for several localities in the Borough of the Bronx, New York City, six one-story frame portable school rooms, measuring 25 x 37 ft., are to be supplied by the city pending the time when the population will call for substantial structures. The plans have been filed for the buildings, which C. B. J. Snyder, architect to the Department of Education, estimates will cost \$1,700.

Skylights Protected by Wire Guards

The use of wire guards for skylights is becoming quite common in all of the large cities where the roof space is so frequently utilized for storage of various articles that there is always a strong possibility that something will be pushed off the high roof and is liable to fall on to the lower roof and shatter the skylight glass. The view reproduced in the accompanying illustration, from the windows of a new building in New York City, is across to the various skylights on an adjoining building.

In the extreme left there is a flat skylight over which there is a wire guard some 8 x 15 ft. in size. Below the center is shown a skylight which, although glazed

with wire glass, is protected with an iron frame to which a heavy wire is attached. Above this central skylight and beyond it is another skylight with its protecting guard, and off to the right are shown two similar wire guards.

In making frame work for the guards covering the skylights bar iron of suitable width and thickness and



View Showing Skylights Protected by Wire Guards

angle bars are liberally used and the wire of $\frac{1}{8}$ in. or larger diameter is woven with spaces of 1 in. to $1\frac{1}{4}$ in. so that should a brick fall from an adjacent chimney or some piece of timber be carried along in a severe fire there is no probability of its bursting through a skylight and setting fire to the building from within.

Abstract of an Essay on Flats

Those of our readers who dwell in "flats" or apartment houses in the large cities of the country cannot fail to appreciate the following abstract of an essay on flats by George Fitch and copyrighted by George M. Adams:

"Flats are an invention whereby people who live in crowded cities can be piled up in layers like pancakes.

"A flat consists of a collection of living rooms all on one floor. A flat building consists of from six to sixty sets of rooms all under one roof and under the overlordship of a janitor who lives in the basement and doses the furnace with coal on the homeopathic plan. A really expert janitor can run a twelve-flat furnace all winter on a wagon load of coal and can so chill the tenants when they come down to complain that their rooms will seem tropical when they return to them.

"Flats are built of brick, wood, stone, strawboard, felt and tissue paper, the latter being used principally for partitions. An economically built flat building is usually provided with a lightwell which is entirely filled with conversation. By means of this well the occupant of the top flat can hear what the husband of the first floor says when the coffee doesn't suit him, and when the woman in number 2 tells her late returning spouse that he is a brute the women in numbers 1, 3, 4, 5, 6, 7 and 8 quiver with simultaneous indignation.

"Flats have handsome hallways fitted with New Jersey Turkish rugs, and back porches where one may have a garden consisting of a geranium. They are also provided with bathtubs and two kinds of water, cold and not so cold. In the cities, owing to the high price of ground, aldermen and building material, the rooms in a flat are sometimes very small—so small that when the daughter is playing the piano the mother has to wash the dishes gently for fear of splashing on the music—so small that the members of the family have to be measured for the bedrooms as they would for vests, and anyone weighing over 180 pounds has to work himself into the bathroom by means of glove powder and a shoehorn."

AN ENGLISH COUNTRY HOUSE OF MODERATE COST

Plans, Elevations and Constructive Details Which Relate to This
Month's Cover Design—Outline Specifications
with Figures of Cost

THE colored design which embellishes our front cover this month represents an English country house of moderate cost, and upon the pages which follow we present the plans and elevations drawn to scale, together with an interesting assortment of constructive details. The type of dwelling shown embodies interesting features and has been used with success in larger residences throughout the country. One of the most notable of its external features is the treatment of the roof.

An examination of the floor plans shows a hall running through the center of the building with the stairs to the second floor rising from a point well toward the rear of the house. At the right as one enters is the living room with its open fireplace of tapestry brick, while beyond is a Den accessible from the main hall, and also from the side porch.

One feature of the layout of the rooms which will doubtless attract the reader is the position of the kitchen at the front of the house and just at the left as one enters from the main porch. The laundry opens directly from the kitchen and is between it and the side entrance. The stairs leading to the cellar are between the kitchen and the dining-room, and over this flight are the servants' stairs to the second story.

There are four bedrooms on the second floor, each provided with a clothes closet. The bathroom is so located as to be readily accessible from all the rooms on that floor.

According to the specifications of the architect the foundation walls are of concrete with a spread footing projecting 6 in. on both sides of the walls.

The super-structure walls are of 8-in. terra cotta blocks for the first story and 6-in. terra cotta blocks for the second story, the construction being as clearly indicated in the detail upon a following page. The lintels of the windows are of hollow tile stiffened with iron rods and concrete.

The exterior tile walls are covered with stucco "pebble dash" finish and colored with pigments. The roof is covered with shingles, which were dipped in shingle stain before being laid.

The chimneys, which have concrete foundations, are of brick, and where they extend above the roof line are finished with concrete and capped by chimney pots. The flues are lined.

The lumber for outside finish is North Carolina pine and the exposed rafters and supports are dressed. The girders are of yellow pine and the floor beams and other framing of hemlock.

The floors are laid with $2\frac{1}{2} \times \frac{7}{8}$ -in. tongued and grooved, first quality maple.

The plumbing fixtures throughout are of standard porcelain make with nickel-plated supply pipes and fittings.

The bathroom has tile floor and sanitary base, and the hearths of both fireplaces are of red Moravian tile.

The rooms on the two floors are plastered, with the kitchen and pantries having a hard, white finish, while the remaining rooms on the first floor, as well as those on the second floor, have a sand finish.

The house is piped for gas and wired for electricity, the fixtures being of approved modern design with four outlets for the living-room and dining-room and two outlets for the bedrooms.

The heating system is hot-air furnace, with registers in walls and floors. The hardware is of neat pattern for locks, bolts, hinges, etc., and black iron finish.

The exterior woodwork is painted and primed with linseed oil and white lead before the finish coat. The interior woodwork is stained.

The architect estimates the cubic contents of the building at 31,800 cu. ft. and cost per cubic foot at 19 cents, making a total of \$6,042, which is based upon New York City suburban prices. These, it may be remarked, are considerably higher than in many other sections of the country.

The estimated cost under the more important classes of work is as follows:

Excavating	\$79
Grading	60
Masonry	1,559
Concrete and cement and tiling	650
Plastering	330
Carpentry	1,456
Mill work	625
Painting	160
Plumbing	375
Heating	260
Metal work	110
Mantels	60
Fixtures, electric work	168
Hardware	150

Total\$6,042

The English country house as here illustrated was designed by Frank T. Fellner, architect, care *The Building Age*, 239 West 39th street, New York City.

Fresh Air to Draftsmen

In a large modern drafting room, carrying a force of sixty or seventy draftsmen and a few clerks, the air is kept fresh by a direct ventilating fan which draws down air from a standpipe on the roof. It is warmed by passing through a radiator coil and then on through pipes down the middle of the room just below the ceiling.

During the extremely hot weather last summer, by a few small piping changes, the radiator was connected with the city water system and a slow circulation of cold water allowed to run through it. The fan was set going and the windows in the drafting room all closed except the ones in the four corners. The result was a circulation of cool air in a steady large volume which made the room 10 or 12 deg. cooler than adjacent offices equipped with electric fans in the usual manner, but without the cooled air draft.

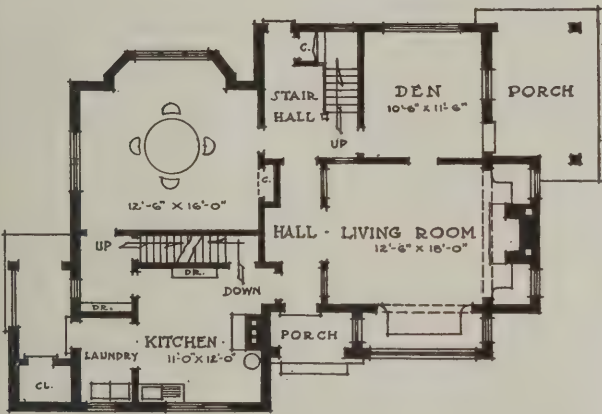
The plans have recently been filed by Architects Neville & Bagge, 215 West 125th street, New York City, for the construction of a 12-story store and loft building on Twenty-first street, 75 feet west of Fourth avenue. It will cost \$300,000 and will have a frontage of 74 ft. and a depth of 85 ft.



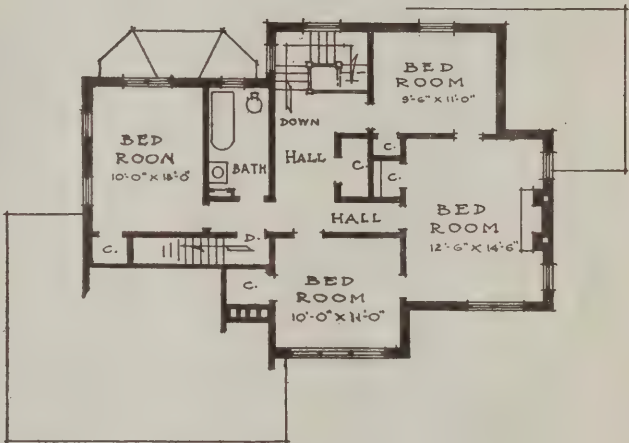
▼ FRONT ELEVATION ▼



▼ SIDE ELEVATION ▼



▼ FIRST FLOOR PLAN ▼



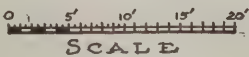
▼ SECOND FLOOR PLAN ▼

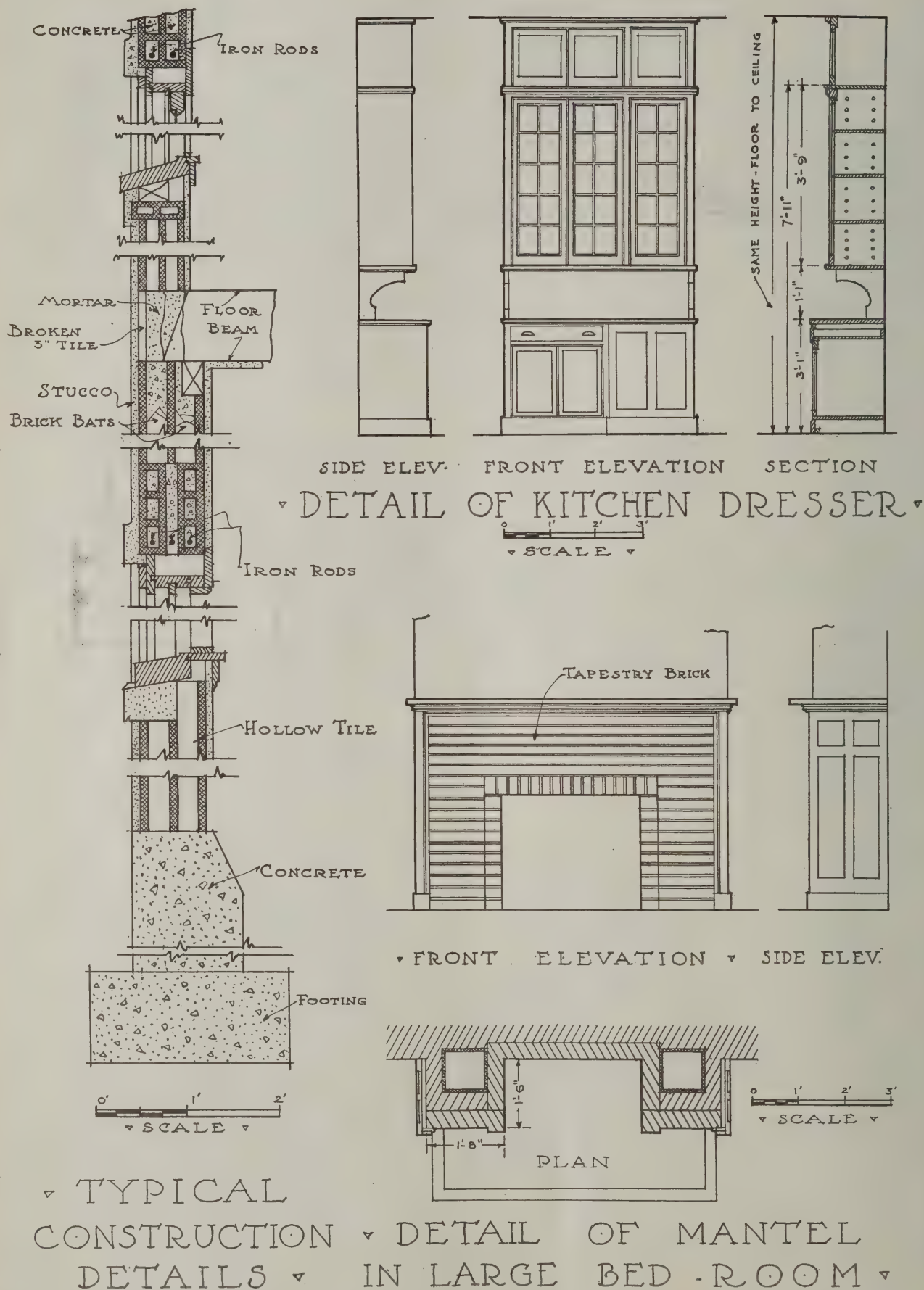


▼ REAR ELEVATION ▼



▼ SIDE ELEVATION ▼





CONVENTION N. Y. STATE ASSOCIATION OF BUILDERS

Meeting Held in Syracuse January 31—A Thoroughly Representative Gathering—Election of Officers—Report of Council Covering Legislative Work

THOROUGHLY representative of the building industry were the delegates from the leading cities who gathered at the Onondaga Hotel on Friday, January 31, to attend the seventeenth annual convention of the New York State Association of Builders. The executive committee with Lewis Harding of New York City as chairman, held a meeting on the evening previous and considered matters of general importance to the association.

The first session of the general meeting convened at 10 o'clock on the morning of Friday, when the report of retiring President D. H. Mapes, of New York City, was tendered and adopted.

Delegates in Attendance

There were fourteen cities represented when the roll was called with a total delegation of 70. The following were in attendance, representing the cities indicated:

Amsterdam—K. B. Schotte, C. B. Machold, Henry Grieme and C. E. Fech.
Albany—E. A. Keeler.
Auburn—Aldrich & Hall.
Buffalo—G. C. Schierer, R. J. Reidpath, A. I. Holloway, Geo. S. Kellogg, T. M. Dyer, H. M. Feist, W. S. Crooker, M. G. Farmer, G. Dark and J. M. Carter.
Corning—M. E. Gregory and J. W. Shea.
Elmira—Chas. Spaulding and C. A. Pulford.
Oswego—Jas. Cochrane, Wm. Ried and Louis Menthol.
New York—

MECHANICS AND TRADERS ASSOCIATION:

L. Harding N. Webb
 F. Usher F. Tuttle
 C. G. Norman W. T. Ritch

MASON BUILDERS' ASSOCIATION

Frank E. Conover J. Odell Whitenack
 Arthur G. Stone Fred T. Youngs
 Wm. Crawford D. H. Mapes
 Edwin Outwater

Niagara Falls—W. H. Gillette.
Newburgh—H. A. Daniels.
Rochester—Henry Fiske, T. H. Swan, Fred Gleason, Geo. H. Swan, B. G. Stallman, J. L. Stiernan and D. D. Dochslab.
Syracuse—R. O'Connor, O'Brian Construction Co., J. W. Dawson, McKale & Son, Ino. W. Gee, D. W. Dickison and Henry Fundy & Son.

After the retiring president had delivered his address, Secretary-Treasurer J. M. Carter, of Buffalo, presented his report showing that several new associations and individuals had joined the organization during the past year. The financial report indicated the general condition of the state association to be healthy and satisfactory.

Report of Council.

The next order of business was the report of the council covering the legislative work for the session of the Legislature of 1912. This report was presented by H. N. French, representing E. F. Eidlitz, the counsel, of New York City. This report showed that of the 553 bills enacted there were 118 affecting the interests of the Builders Association. Of these the Legislative Committee voted to oppose 15 Senate bills and 34 Assembly bills. Among these bills was that creating a state insurance fund for the benefit of employees in hazardous trades to be administered by a state commission and formed from contributions of 90 per cent. on the part of employers and 10 per cent. on the part of employees and depriving employers who refused to contribute to this fund of the common law defense when sued by their employees in negligence actions. Other bills of a somewhat similar nature were introduced; also five constitutional amendments dealing with

employers' liability, workmen's compensation and state insurance for injured employees. The counsel in his report states that there were no less than 109 bills regulating labor or amending the state labor laws and of the 49 bills which the Legislative Committee decided to oppose not one became a law.

At 1 o'clock in the afternoon the members adjourned for luncheon, the New York State Association acting as host to the delegates.

Workmen's Compensation Laws

Following the luncheon Hon. Cyrus W. Phillips of Rochester gave an extended address on workmen's compensation laws in operation in other states and legislation along the same lines proposed in New York State. His talk partook of the nature of a detailed explanation of the operation of these laws, the speaker expressing the opinion that the Michigan law was the nearest a model compensation bill in operation.

Mr. Phillips' address was followed by a general discussion, and while no definite results were presented the sentiment reflected by the individual members at the convention was in favor of a workable practical compensation act.

Election of Officers

The Nominating Committee, with Fred Gleason of Rochester as chairman, and one member of each city represented in the conference, placed the following names before the meeting:

President, George L. Swan of Rochester.

First Vice-Pres., C. G. Norman of New York City.

Second Vice-Pres., M. E. Gregory of Corning.

Sec.-Treas., J. M. Carter of Buffalo.

Counsel, E. F. Eidlitz of New York City.

These officers were duly elected and installed to serve for the ensuing year.

General Welfare Committee

A committee which is to be known as the General Welfare Committee was appointed by the president as follows:

E. A. Keeler, Albany.

M. E. Gregory, Corning.

H. Grieme, Amsterdam.

T. H. Swan, Rochester.

H. M. Feist, Buffalo.

H. N. French, New York City, Counsel.

J. M. Carter, Buffalo, Sec.-Treas.

G. L. Swan, Rochester, President.

The delegation from Rochester extended an invitation from the Rochester builders to hold the next convention in that city. The matter was referred to the Executive Committee for consideration.

The Steady Subscriber

How dear to our heart is the steady subscriber
 Who pays in advance at the birth of each year—
 Who lays down the money and does it quite gladly,
 And casts 'round the office a halo of cheer.
 He never says, "Stop it; I cannot afford it,
 I'm getting more papers than now I can read."
 But always says, "Send it; our people all like it—
 In fact we all think it a help and a need."
 How welcome his check when it reaches our sanctum;
 How it makes our pulse throb; how it makes our hearts dance.
 We outwardly thank him; we inwardly bless him—
 The steady subscriber who pays in advance. —Inland Printer.

CONSTRUCTING A CONCRETE SIDEWALK

Some Suggestions for Doing a First-Class Job—The Foundation—The Mixture—The Topping

IN the building of concrete sidewalks there is room for considerable exercise of judgment and common sense, therefore a great many people believe that a man who does such kind of work in a manner different from that to which they have been accustomed, cannot be doing good work.

The subject of preparing the foundation creates con-



Constructing a Concrete Sidewalk—The Effect of a Well-laid Walk with Attractive Surroundings

siderable discussion when, as a matter of fact, on this point there should be no differences of opinion. The usual specifications call for a base several inches thick of cinders and when putting down the cinders it is seldom that pains are taken to clean or screen them. The result of such carelessness, writes Ernest McCullough in a recent issue of the *Cement Era*, is that ashes and dirt in the cinders finally pack down and the sidewalk cracks and settles. When cinders are used, no pieces should be larger than one inch in size and all dust and ashes should be screened out. After the cinders have been screened to remove the dust and ashes they should be thrown into a box having a bottom composed of $\frac{1}{8}$ -inch wire mesh and a strong stream of water should be turned on with a hose to wash out mud and common dirt, the cinders in this wash box being only about 3 or 4 inches deep in order that the water may go through readily without breaking up the material.

Some contractors and officers in charge of public works departments claim that a cinder base should be put under all concrete sidewalks while other men who have successfully built sidewalks without a cinder base claim the cinders are not necessary. It sometimes happens that both parties to a controversy may be right and the question of cinders or no cinders under concrete sidewalks is an illustration of this. Cinders are specified merely because they are cheap. Coarse sand or screened gravel are both superior to cinders. When using gravel or sand, special pains should be taken to secure material in which the grains

are nearly uniform in size in order to secure a large per cent. of voids. The object of a foundation of porous material is to furnish proper drainage and it is therefore not necessary when the sidewalk is laid upon a soil that naturally drains easily, such as gravelly or sandy soil for example. This porous base is not necessary in any soil where the frost does not penetrate and therefore the presence of water in the soil is not likely to cause any heaving when thawing sets in.

If the sidewalk is built over a tough clay or tight soil the base of cinders or gravel may be harmful instead of beneficial if no way is provided to remove the water that will collect in the porous base. This applies to all sidewalks wherever built and no matter what kind of soil the sidewalk may be placed on, a porous base will be harmful unless proper drainage is provided. When such drainage is not provided the best way to build a sidewalk is to place it on the bare earth and endeavor as nearly as possible to secure a tight joint so the sidewalk and earth will practically become one. This view of the matter settles the question of the porous base under a sidewalk. A sidewalk like any other structure, requires as solid a foundation as it is possible to secure and to put a "cushion" between the earth and sidewalk is no more logical than to put a cushion of any kind on top of a post, underneath a beam supported by the post.

The usual specifications for a sidewalk call for a mixture composed of 1 part of approved Portland cement, 3 parts of clean, coarse sand, and 5 parts of clean, broken stone or screened gravel ranging in size from pieces $\frac{1}{4}$ -inch in diameter to pieces not exceed-



A Concrete Sidewalk at Hollywood, California

ing $1\frac{1}{2}$ inches in diameter. This is placed in a layer having a thickness when finally compacted, of from 4 to 5 inches and on top of this is placed a coat of cement mortar. A common fault is to make the thick body entirely too dry so that it does not compact very well and the sidewalk after a few years goes to pieces.

Some men go to the other extreme and make the base too wet and each man holds strongly to his own ideas of what is right. The truth lies as usual, between extremes.

All concrete should contain enough moisture to en-



Constructing a Concrete Sidewalk—Showing Provision for Sidewalk Expansion of Curb

able it to set properly and the smallest amount of water to use will be such that when the concrete is tamped thoroughly the water will distribute itself through the mass in such a way that it will quake like jelly and there will be no free water appearing on the surface. The concrete before tamping, should be of a consistency resembling moist brown sugar. A handful squeezed will retain its shape when the hand is opened and no stain will appear upon the skin. When the hand is shaken the lump of concrete will become loose and fall down. This is the minimum amount of water to use and the maximum amount should be such that the concrete will be sticky like very wet dough. There should never be so much water in the concrete that it will stand on the surface or can be poured off and the concrete should never be so thin that it will run very readily when tipped from a wheelbarrow.

Between these two extremes the contractor has a wide range, merely remembering that in cold weather too much water makes concrete slow setting and therefore increases the danger of freezing. In warm weather much water should be used because the sand and stone are then very dry and likely to absorb water required for setting purposes by the concrete.

The topping consists of a mixture of 1 part of approved Portland cement to 2 parts of clean, coarse, sharp sand mixed in a mortar having such a consistency that it will stand in a moderate sized heap with sides sloping about as much as the roof of an ordinary house. Water will not run from it and when a trowel is drawn over the sides it will leave a smooth mark without causing water to appear. Sometimes the sand and cement are mixed in equal quantities and sometimes the mixture consists of 1 part of cement to 3 parts of sand, the exact proportions depending very largely upon the character of the sand and the skill of the finisher. Finishing is an art and is not an exact science. It takes years to make a first class finisher on concrete sidewalks and the best sidewalks are those on which the contractor employs the most skilled finishers he is able to procure.

Too much working of the topping is apt to bring the cement to the surface and also brings to the sur-

face an excess of water. The excess of water kills the cement that is drawn to the surface and the result is a sidewalk that "dusts" and never ceases to wear away, a new surface being required within a very short time, if indeed the result of poor work in the top does not cause the whole sidewalk to go to pieces. In ordinary work the body of the sidewalk is first laid, the topping being added as soon as possible and before the body concrete has had a chance to become set. This is necessary to prevent the separation of the top and body. For this reason, the contractor should never carry the body very far ahead of the topping and a period of more than three hours should never elapse between the time of placing body concrete and the topping. The longer the time permitted to elapse the drier should be the concrete topping and the more sand it should contain in proportion to the cement, because the more sand the slower the setting and if the topping sets too rapidly it cannot bond properly with body concrete already partly set.

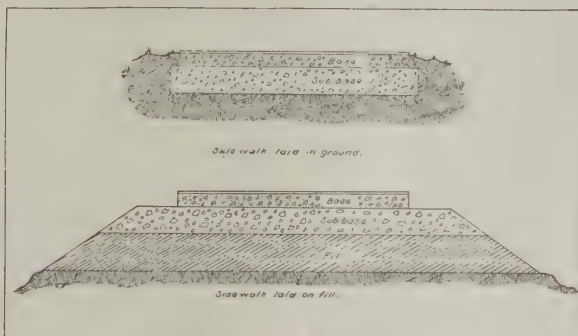
The writer has constructed a great many miles of sidewalk without adding a topping coat. His method is to mix the body concrete with somewhat more moisture than is customary and lay it the full thickness of the sidewalk.

The surface is tamped with a tamper made of crossed bars resembling in appearance a wire potato masher. This form of tamper pushes the stones down and lets

the mortar come to the surface. Whenever water appears, dry cement is sprinkled over it and the whole surface of the sidewalk is given a sprinkle of dry cement which is smoothed over with trowels in the ordinary way. The writer has never heard of a sidewalk "dusting" when dry cement is sprinkled over the surface and worked into it properly, the "dusting" of sidewalks and floors in his opinion being largely due

to the fact that the cement on the surface has been killed by the free water brought to the surface by the finishers.

Expansion joints are necessary in all sidewalks and should go from the top to the bottom, a scratch $\frac{1}{2}$ -inch,



Showing Section of Walk as Laid on Level Ground and as Laid on "Fill"



Another Good Example of Sidewalk Construction

or 1-inch deep on the surface not being an expansion joint. All sidewalks should be built in blocks from 4 feet to 6 feet square, laid alternately, a piece of heavy tarred paper being placed against the form board, bent into the shape of an angle with one leg against the

board and the other on the ground under the edge of the concrete. When the blocks have set, the form boards are removed and against the pieces of paper on each end of the block in place should be placed similar pieces of paper, so that in each joint there will be two thicknesses of tarred paper. The blocks between are then made and after the walk is completed the paper appearing upon the surface may be cut off or be left to be worn off by traffic.

When a sidewalk is completed it should be covered with one or two inches of wet sand and this sand should be covered with canvas or burlap which should be wet every day with a hose for at least one week, boards being laid over the top of the cloth for the use of pedestrians. If the contractor does not wish to use cloth he can cover the sidewalk with four or more inches of sand and sprinkle the sand every day for a week, covering the sand with planks. Nearly all sidewalk troubles come from the fact that the sidewalks are thrown open for use before they are properly cured and concrete can be properly cured only by keeping it moist for a week at least.

When building concrete sidewalks in freezing weather the water should be warm so that it has a temperature of not more than 100 degrees and the sand and stone should be warmed also, but not so much that they feel uncomfortable to the hand for a high degree of heat spoils cement. Boiling water should never be used. When covering the sidewalk for the night in cold weather, straw or sawdust are good. Manure has been found to be injurious in a large number of cases when laid upon concrete before it has acquired its final set, so manure should never be used.

Death of Isaac A. Hopper

Isaac Abraham Hopper, for many years a prominent contractor and builder in the city of New York, and who recently died at his residence, 165 West 122d Street, was in the sixty-first year of his age. The contracting business descended to him from his father, Abraham Hopper, who was among the most prominent of the early settlers in the Harlem section of the city and who erected entire blocks of dwellings in that locality. Mr. Hopper's birthplace stood near the Harlem end of McComb's Dam Bridge. His early education was received in the public schools, after which he attended and was a graduate from the College of the City of New York.

During his business career Mr. Hopper executed many large contracts, including the New Netherlands Hotel, the former Emigrant Industrial Savings Bank, the power house at Kingsbridge of the Third Avenue Railroad Company, the power house of the New York Central Railroad Company, the Marie Antoinette Hotel, Carnegie Music Hall, Hotel Normandie, a number of public school buildings, and the Third Avenue Bridge.

He was at one time president of the Building Trades Employers' Association, a member of the Board of Education, and the first president of the Harlem Democratic Club. Of late years, however, Mr. Hopper gave most of his time to his duties as president of the Empire City Savings Bank.

Advantages of Portable School Buildings

The question has been raised by an English medical officer in a note to the Board of Education for the county of Huntingdonshire as to the wisdom of erecting substantial school buildings of brick or stone. He points out that modern schools are better adapted for the purposes for which they are intended than were the older ones, but the end has not yet been reached. Consequently it follows that if temporary buildings can

be erected to last, say thirty years, the community is in a better position than if it built a permanent structure to last a century, but which for the last seventy years would be obsolete.

Schools are like motor cars or dreadnoughts—they are all right until something better comes along. The contention is that if temporary schools can be built at \$10 a head to last thirty years it is much better than piling up bricks and mortar at \$50 a head and wishing five-and-twenty years hence that it was possible to pull them down and start afresh.

Among some of the advantages of portable school buildings as pointed out by Dr. Moss-Blundell, the medical officer in question, are the following:

"They may be easily moved from one district to another, or rooms may be added or taken away according to the changes in the population. This is a very important point nowadays when town populations are increasing and villages decreasing. In the event of their not being required as schools, they may be moved to a suitable site and used as isolation hospitals or for other purposes; their very portability makes them saleable. The objection that has been raised against them in the past has been that they are hot in summer and cold in winter. This no doubt was the case in the old galvanized-iron structures, but the question of equability of temperature has been completely solved in modern buildings, and it is my belief that we should be well advised in giving a trial to this class of school in this country."

National Builders Supply Association

At the convention of the National Builders Supply Association held in New Orleans, La., the last week in January, Edward S. Walton, of Youngstown, Ohio, was elected president for 1913, one vice-president for each state having a membership in the association was named, and H. W. Classen, of Baltimore, was re-elected treasurer. The secretary is to be chosen by the directors. Walter F. Jahncke, of New Orleans, was elected chairman of the board of directors.

During the business sessions a number of scientific and technical papers on questions of interest to contractors and dealers in building materials were read, these including among others:

"Business Efficiency," by A. B. Francisco, state manager the Sheldon School, Dallas.

"Waterproofing Concrete," by Dr. Maximilian Toch, lecturer on concrete and kindred topics at the College of the City of New York.

"Profit Sharing," by Charles Warner, of the Charles Warner Company, Wilmington.

"Sand and Gravel Apparatus," by Raymond W. Dull, designer and construction of a special system.

"Why the Building Supply Dealer Is Vitaly Interested in the Best Concrete Floors Obtainable," by N. E. Newman, president of the Master Builders' Company, Cleveland.

The annual banquet was held at the Grunewald Hotel on the evening of January 31, covers being laid for more than 300 guests. Retiring President Charles Warner was toastmaster and among the speakers were E. J. Allen, of Lincoln, Neb.; James W. Porch, former president of the Progressive Union, who spoke on New Orleans as the coming hub of the maritime universe; Warren B. Reed and L. E. Bentley.

No city was chosen for the fourteenth convention, as the place will be named by the board of directors.

Charles A. Rich has recently prepared plans for a \$300,000 structure for Fifth avenue and 13th street, New York City. Ginn & Co., publishers, will occupy a portion of the building.

GREENHOUSE CONSTRUCTION AND THE BUILDER

Some Thoughts Suggested by one of the Tendencies of the Present Day—Prime Factors in the Construction of Greenhouses

By WARFIELD WEBB

THE greenhouse properly constructed is a source of much gratification to the home owner and his family, while at the same time it is a form of work in which the country builder is especially interested. One of the important factors in the production of good



A Greenhouse at Grosse Point Farms, Detroit, Mich.

work is necessarily good materials in combination with good workmanship. In order to accomplish desired results a certain amount of knowledge is also demanded in this particular field. It might perhaps be added that a little knowledge is sometimes a dangerous thing in this connection, for it is a seemingly simple matter to construct a piece of work of this nature. Its very simplicity, however, is likely to prove a stumbling block for the builder who has not studied it with sufficient care to master the little details that are of importance to insure success. The building of a greenhouse or indoor garden as it may be described, has several general rules and there are always in addition to these specific instances that demand like attention.

Primarily the location of the greenhouse is the first fact to be made clear. If it is to be builded in the open, on the lawn, there is to be noted the size, surroundings and general aspect of the ground. This will not demand as much consideration as where the greenhouse is to be erected against the house, or as an extension of another building, such, for instance, as the garage, as is sometimes done. Then there are the instances where it has been a widening or the enclosing of the porch to allow for the housing of plants and gardening.

Sometimes the erection of a greenhouse adjoining a house increases the actual difficulties, while the cost of the work to the owner is less due to a decrease in the amount of materials used. Occasionally a cellar is adjacent to the place designated as the site for the

greenhouse, and it will demand more serious study. The object to be taken into consideration in this way is the amount of moisture possible to accrue, the added heating necessary and the possibility of cool draughts.

The prime factors in the construction of greenhouses hinge on several things. Good materials, heating, ventilation and arrangement. It seems a very simple structure. In this way it differs much from an ordinary building that is simply to be made proof against the elements. It houses, nurtures and develops the most delicate plants. It usurps, in a certain sense nature's work, and makes possible the budding rose or the sweet violet in the dead of winter. It grows the most delicate vegetables for our tables in the coldest months. It assists in the growth and ripening of luscious fruits in January.

These things are pointed out simply to show that there is demanded deep study to make the essentials of moment to the man who essays to plan the house. The foundation must be of some dependable material. Stone, concrete and brick are the materials suited for this purpose. It is not conceded that either of the former have any particular advantage over the other. They are all capable of bringing about the combination of heat and cold for the several seasons of the year. However, there should be care given to the laying of the foundation. Slighting the work or skimping on the materials will not be conducive to a satisfactory contract.

The foundation is an essential part of the labor, and it is well to see that there is ample to insure against errors in this way. Sometimes the entire structure is



An Attractive Greenhouse at Saugatuck, Conn.

constructed with reinforced concrete, though in most instances lumber is used for a portion of the work. An iron or steel frame is also far preferable to a wooden structure. What is wanted here is durability. The framework is the support of the structure. Making it of wood is sure to prove unsatisfactory sooner or later. Of the wood used, cypress has been found of

admirable quality for this character of construction. The best grades should be used, as they will give the added wearing qualities that become important here.

If we consider the entire structure it will be noted that there is but little material of any kind demanded. However, this must be of the best. Moisture is the deadly element that will soon eat its way into the very heart of the material if it does not withstand the attack stolidly. There is real economy in building such structures only with the best materials and this will insure satisfaction.

If the builder is to plan his own house, after the ideas of the owner, he should keep in mind the points noted above. He should first inspect the location, then plan accordingly. If he has the ability to make drawings it would be advisable for him to make his plans along this line. In work of this kind there is apt to be too much of guess work, and the results will not reflect upon the builder. The selection and purchase of the materials should only be done by one who has the knowledge to carry out this detail.

It is a serious error to economize in this character of work, and the man who is looking for low cost work of this character will never be repaid and the builder who undertakes it will very probably get his share of the blame. Of course if a small greenhouse is desired it can be erected with a moderate outlay. More depends upon the size than upon the cost many times, and there is reason why this addition to the lawn or house should prove more popular with owners of moderate priced homes. It is not to be construed into the belief that the greenhouse or the indoor garden is a luxury of the wealthy only; it is an adjunct that is more than a luxury, it is a factor that adds its mite to the question of economic living and to the greater pleasure and charm of the home.

Some manufacturers of material for the greenhouse ship the sections with plans that make it an easy matter to be put together and with comparatively little labor. There is sometimes an advantage here to the builder in that it relieves him of much annoyance and of the danger of serious errors and possible loss in the build-

Looking at the matter from every angle it should be one that is worthy of the builder's consideration. The increasing popularity of the feature will be more notable each year, and the man with a city home, with a moderate lawn can avail himself of an opportunity here to bring nature to his own doors and to do so in a way that will be profitable and at the same time he can



A Conservatory at Holyoke, Mass.

be assured that the investment will be found advantageous in the event that he wishes to dispose of his property. Keep this in mind and the man who can plan has an opportunity here that will be well worthy of just a little more study on his part.

The pictures from which the accompanying engravings were prepared were loaned by the Lord & Burnham Co., Irvington-on-Hudson, N. Y.

Roofing Materials in Norway.

According to a recent report from Consul General C. A. Holder, Christiania, Norway, 50 per cent. of the roofs in Norwegian cities are of burnt clay "stones," as the Norwegians call them, or large, thick tiles. These are made in all parts of Norway and cost, inclusive of the labor of laying them, about 35.8 cents per square yard. About 48 per cent. of the roofs are slate, the latter being quarried in Norway. The slate roofing costs, including the labor of laying it, about 63 cents per square yard.

The remaining 2 per cent. of urban roofs and a large percentage of roofs in the country for sheds, barns, etc., are of galvanized iron. This roofing, imported free of duty from England, is sold in Norway for 3.28 cents per pound, or for 33.6 cents per square yard. This does not include the cost of laying it, this labor being paid for at the rate of 24.1 cents an hour, or \$2.41 per day of ten hours.

The lumber used for supports for roofs usually comes

in pieces 5 x 6 in. by 6 to 24 ft. This lumber costs 20 ore per Norwegian foot (5.36 cents per 13 1/16 in.) and has to be renewed about every 70 or 80 years. Lumber, therefore, does not enter largely in the cost of roofing after it is laid.



Another Attractive Example of Greenhouse Construction, Located at Highland Park, Iowa

ing of the greenhouse. If the owner prefers to purchase his structure in this way there should be no complaint on the part of the builder. He shifts the greater responsibility on the other parties, and still has an opportunity to make a nice profit from his labor.

EUROPEAN VS. AMERICAN BUILDING CONSTRUCTION

The Two Main Periods Through Which Buildings Pass—Building Supervision Abroad More Severe than in America



REFERENCE was made in these columns a short time ago to the various papers read at a recent meeting of the Builders' Exchange at Canton, Ohio, among the number being one by Edmund Hermann, a local architect, who compared European and American methods of building construction.

At the outset he referred to the great destruction of buildings by fires and other causes and compared the state of affairs in this country with those which existed abroad. He pointed out that voluminous laws and ordinances regulate every phase of building construction, and where violations occur the guilty ones are prosecuted regardless of their social standing. He called attention to the fact that there are two main periods through which buildings have to pass in order to reach a successful ending, these being their "Planning and Designing" and their "Construction and Erection." These two distinct divisions are the same the world over, but the carrying out of their meaning and purpose is so different from each other in this country and Europe that it pays well to compare them.

Planning and Designing

The first operation, the "Planning and Designing" is done by the owner with the assistance of a professional adviser, who may be called "architect or builder," and who is supposed to understand not only the construction of buildings but should be familiar with the laws of statics; have knowledge of all the materials used in every building to the minutest detail; a true understanding of the different arts and crafts, and last, but not least, he should be trained to harmonize beauty with utility.

All this knowledge is necessary to the adviser in order to give the owner proper service.

Mr. Hermann then raised the question that with the adviser equipped with all this knowledge, why is it that we do not get the correct results?

Architects Undergo Severe Training

The architects of the Old Country have to go through a severe training to acquire all this knowledge and must prove that they understand the planning of buildings, being graduated from technical colleges, which gives them the right to call themselves architects. If anyone else would undertake to call himself an architect without having the required knowledge, he would be liable to prosecution. In our country an architect is in many cases simply an amateur that has nerve enough to stand up before the people and take advantage of their ignorance and give them services for just a nominal fee that leads the owner into all kinds of trouble, with the final result that the construction of a building is only a makeshift of what it really ought to be.

The two great institutes of American Architects, recognizing these facts, are endeavoring to secure laws in every state which will require every architect to

have a license, just the same as licenses are required for doctors, druggists, etc.

Construction and Erection

The second operation, "The Construction and Erection," is just the same as transferring theory into practice. The plans are turned over to the building contractor to carry out the ideas as laid down on paper. In very few cities of our country plans must be submitted to some building department for approval. In Ohio the state requires all plans which comprise the construction of theaters, assembly halls, churches, school buildings, club and lodge buildings, to be approved by the State Department, and some of the larger cities as Columbus, Cleveland, Toledo, etc., require the submission of plans to the City Building Department. In smaller cities there are no authorities to look after this matter. In the Old Country every plan, whether it is a new building or a small addition to any dwelling house or even a stable, must be submitted for approval to the authorities.

The Old Country is divided into inspection districts of about the same size as our counties. In every county a learned architect is standing at the head of a department. This architect is called District Inspector. To him every owner has to submit plans in duplicate. These plans must show the details of construction and must be accompanied by a plain but extensive description of the construction, showing for what purpose every room and every space will be used, what loads are intended to be placed, what safety factors are used for computing the different members supporting those loads, and the fee paid to the County Treasurer is figured according to the class of construction and cubic contents. The District Inspector will only approve those plans which comply with the requirements of the building laws, which are the same all over the country. Finding errors, he will return the plans for adjusting the faults, and will never approve anything that does not come up to the requirements of the laws.

The Inspection Department

But it is not sufficient to have plans approved by the State Department. It is just as essential to have trustworthy persons look after the erection and to find out whether the owner is constructing the building according to his approved plans. This again is done by members of the same Inspection Department, and there are two ways to do this. There are many ordinances in every city which govern the safety of the men employed by the contractors and protecting the people from injury they might receive by entering buildings under construction or passing by them on the streets. To have these ordinances properly enforced the police in general will look after and inspect every building under construction in short intervals. To get acquainted with these ordinances, the police lieutenants gather their men every morning to read new ordinances and explain the meaning of old ones, so that the men might get acquainted in a short time with the requirements which the laws provide for those purposes.

The second supervision is done by a special commission, of which the District Architect is the head,

and which, furthermore, consists of three more practical builders appointed by state authorities. This commission visits every building twice during its construction, the first time after the building is made watertight, that is, after it is covered with a roof but not plastered, so that the members of the building commission can see the rough construction and check every detail of the carrying members. After this visit the building dare not be touched for six consecutive weeks, except for work which must be done by plumbers and steam fitters. This period of six weeks is very essential to a healthy and dry building, when you consider that all the buildings used for occupancy of people must be of slow burning or fireproof construction, and when you consider the time it takes to dry out a brick building, as it has no wall less than 13" and the joists of which are never less than 6x8", with the open space between filled with incombustible material, you will clearly see the reason for giving the building such a long time to dry out.

The Final Inspection

The final inspection is made when the owner applies for "Receipt of Acceptance," that is, when it is ready to be occupied. The same commission which visited the building the first time concludes its inspection with this last visit and certifies the owner the acceptance, which means that he can rent the building to tenants or occupy it himself. No part of any building can be occupied before this commission has made its final inspection. The fee which is paid by taking out the building permit is used for paying the expenses of this afore-mentioned building commission.

The material used in the construction of buildings in the Old Country is the same as the material which we use here. The main difference is that the work is done in a more substantial way and that it is the endeavor of every owner and builder to build houses that last and will pay better interest in the long run, instead of trying to break records every time a new structure is to be erected.

Limiting Heights of Buildings

In large cities the height of buildings is limited in proportion to the width of the street and so it is that long streets show you all the buildings of the same height, which we call sky-line. This sky-line would be monotonous to look at, but the roofs are constructed under all kinds of angles, and are ornamented with dormers, towers, etc., and so relieve the monotony of this sky-line. The main cornice of every house when it is constructed of wood, must be protected with metal about 5' away from the adjoining building on either side to prevent the spreading of fire over to the neighbor's cornice.

Every room must be provided with plank gangs for inspection of the chimneys, which are regularly cleaned by licensed chimney sweepers, as all the ovens, stoves, kitchen ranges, etc., are heated by coal or wood, which necessitates a cleaning out of the chimney flues, to avoid clogging up.

The number and size of windows is regulated in proportion to the depth of each room. Wings adjoining front buildings must be closed by fire walls, extending 2' above the roof and having iron doors to connect the different stories.

All the openings along the neighbor's lot must be closed with solid glass brick of wire glass and no window of any kind is permitted.

This, I think, gives you in general, some idea of the difference between European building construction and supervision and the construction and supervision in our country, and I hope that it will not be long before municipal and government laws in our state will control the erection of our buildings, whether public or private, along the same line.

Advantages of Membership in a Builders' Exchange

In setting forth the benefits of membership in a builder's exchange, Secretary Edward A. Roberts, of the Cleveland Exchange, in a leaflet just issued suggests that each member is given special advantages:

For cultivating business relationships of the utmost value.

For meeting your competitors on friendly terms.

For elevating your business and correcting abuses.

For expressing your wishes on legislation affecting your business.

For united action on labor matters through Employers' Board.

For raising the standard of construction through improved regulations.

For upbuilding the city through promoting of civic improvements.

For hearing instructive addresses on topics of interest (noonday luncheons, etc.).

For meeting architects in joint sessions both social and business.

For obtaining valuable information not easily secured alone.

For recreation—summer outings, smokers and other entertainments to promote acquaintance.

Death of a Providence Architect

Clifton Alexander Hall, one of the oldest and best-known architects in New England, died at his home in Providence, R. I., January 12, following a lingering illness. He was born in Boston, Mass., January 20, 1825, and was therefore in his 88th year when he died.

He was educated at Fowles Monitorial School and later entered the office of his father, who was a widely known architect in that city. About 1855 he went to Providence with his father and established the firm of C. G. Hall & Son, with an office in the old Franklin House. Among the early work of the firm was the erection of the What Cheer Building on Market Square, the Savings Bank on South Main street and the granite entrance to the North Burial Ground. At one time Mr. Hall was in partnership with Alpheus Morse, and was later for several years the partner of C. R. Makepeace.

After designing many residences, public buildings and churches in Providence and in the South, he turned his attention to mill building, designing the Atlantic, the Delaine, Riverside and National India Rubber Works plants in Rhode Island and many mills in New York, Pennsylvania and Canada.

He was one of the early members of the Art Club of the Rhode Island School of Design, serving on the board of management of the school many years. He served in the House of Representatives from 1880 to 1882, and was for a long time a member of the school committee of Providence. He was one of the last two surviving charter members of What Cheer Lodge No. 21, A. F. and A. M. He was made a Royal Arch Mason by Providence Royal Arch Chapter No. 1, June 22, 1855, and was the last surviving charter member of Calvary Commandery No. 13, Knights Templar, having been knighted in St. John's Commandery in 1859. He was also the oldest member of Providence Council No. 1, Royal and Select Masters, having been greeted in that body January 3, 1856.

An authority on the subject says: "Never patch a dry piece of concrete and then let the finish dry out. You cannot get a hard surface without plenty of water, and keeping it wet for at least a week and keeping wear off for that length of time."

HEATING A COUNTRY HOUSE BY COMBINATION SYSTEM

Features of a Heating System Involving the Employment of Warm Air and Hot Water in a Country Residence—Round Risers to Rooms on the Upper Floors

THE satisfactory warming of buildings is something in which every progressive builder is at least incidentally interested and the particulars which follow relating to the supplying of fresh warm air through registers and circulating hot water through radiators for purposes of this kind in a country residence cannot fail to command the attention of many of our readers. Quite often people who are building houses with large rooms on the first floor do not like to give up the space required for the necessary radiators and they also want proper ventilation but are not inclined to consider a system of indirect steam or hot water, owing to its

having been erected in accordance with plans and specifications prepared by Kilham & Hopkins, architects, 9 Park street, Boston, Mass. The heating system comprises a twin combination furnace and there are four fireplaces—two on the first floor and two on the second floor—which act as ventilating flues as well as auxiliary heaters.

An appearance of the finished house is presented in the half-tone engraving which appears upon this page. It faces the southeast and is exposed on all sides. The entrance is through a large hall from which rises the main stairs, a view of which is afforded by means of



Heating a Country House by Combination System—Photographic View of Residence of Dr. Charles F. Painter at Newton, Mass.

first cost and the amount of coal required to operate it.

With a combination heater the rooms near the furnace may be heated and ventilated by warm air while the rooms which are farthest from the furnace or which have an unusual exposure may be heated by direct radiators. During the spring and fall when the mornings and evenings are cool a small wood fire quickly gives out all the heat necessary to take the chill from the house and still not over-heat it during the day. In first cost the combination system compares with the direct radiator system and in coal consumption the cost can be made something less.

A combination heating system which has demonstrated its efficiency is that installed in the residence of Dr. Charles F. Painter at Newton, Mass., the house

the half-tone on a following page. This view shows at the right of the newel post one of the floor registers used for warming the hall.

On the main floor at the left of the hall is the living room out of which one may pass to the sun parlor or enclosed veranda. Beyond the main hall is a reception room, while opening at the right from the hall is the dining room and beyond this the kitchen, communication being established between the two by means of a commodious and well arranged butler's pantry. Under the main stairs is a toilet.

On the second floor are various sleeping rooms with private baths and dressing rooms and on the third floor are guest chambers, servants' rooms, bathrooms, etc.

The miscellaneous details which are shown herewith

the early fall and late spring and as auxiliary heaters during the severe winter weather.

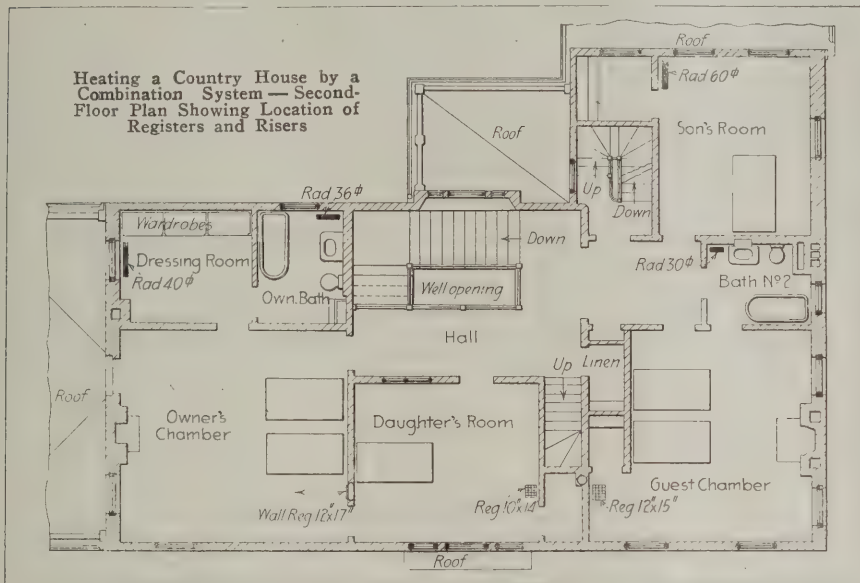
It will be noted on examining the first floor plan that all of the rooms here are heated with registers except the servants' dining room, which has a radiator in it. The radiator was placed in this room in preference to a register owing to the ease with which hot water may

makes it more convenient for connecting the hot-water pipes over the furnace.

It will be noted that the cold-air duct runs along the ceiling of the cellar to a point where it drops down on an angle to facilitate the inflow of the air to the furnace and to prevent any heat from the furnace influencing the inflow of cold air detrimentally. The cold-air duct is made of galvanized iron throughout its entire length and is divided at the point of connection with the furnaces. A sliding damper is placed in each duct.

An advantage of a twin furnace plant is exemplified in this heating system, as one furnace supplied all the heat necessary up to the first of December, 1911, and both furnaces were used only during the coldest weather. When the weather grew mild toward the spring one furnace was allowed to remain idle.

The severity of the winter of 1911-1912 was greater than the average New England winter and yet for maintaining a comfortable temperature not in a part but throughout this entire home required but 20 tons of



be circulated to heat a room that is so far away from the heater. It will also be easy to see why the dressing room and the son's chamber are heated by radiators, as it would be difficult to reach these rooms with warm-air pipes.

All the bathrooms are heated by means of radiators of a sufficient size to be more than capable of maintaining a temperature of 70 deg. in extreme cold weather and to insure the bathrooms being warmer than the other rooms in the house. Only one room on the third floor is heated with warm air, as it would have been difficult to reach some of the other rooms with warm-air pipes. This one pipe which is carried up has to pass through a cold closet and is made double.

The plans provide for a separation of the servants' dining room and the servants' sleeping rooms and bathroom from the main portion of the house and all are heated by direct radiation.

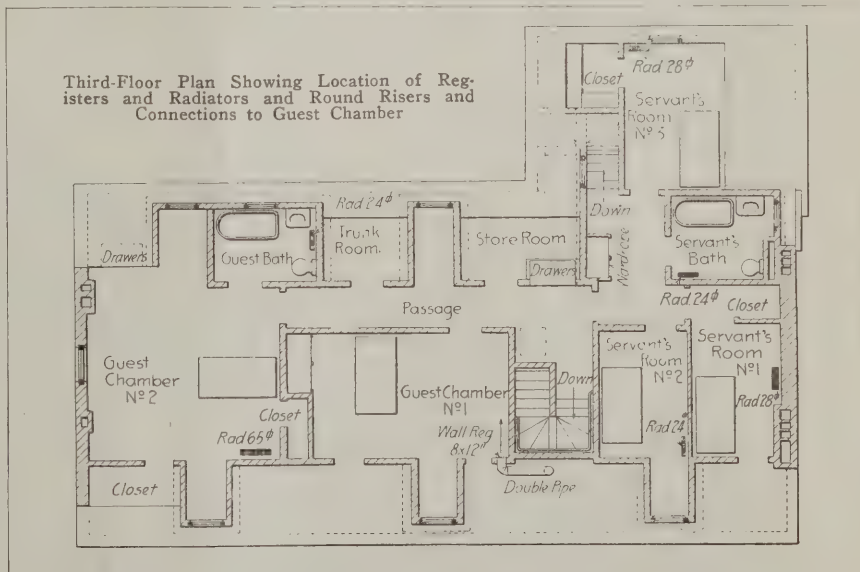
All of the registers are brass plated made by Tuttle & Bailey Manufacturing Company, New York City, and the radiators are all of the plain Peerless pattern.

The furnace casings have an inner lining of bright tin with a small air space between to prevent heat radiating through into the cellar. As will be seen from the small elevation the top of the furnace is flat with an inverted cone which forms a double top with an insulating air space of about 6 in. over the center of the furnace. This inverted cone also serves as a deflecting plate to turn the air rising from the furnace into the warm-air pipes which are connected to the side of the casings.

This method of connecting the warm-air pipes allows the furnace to be made something lower in height and to give a better pitch to the pipe. It also

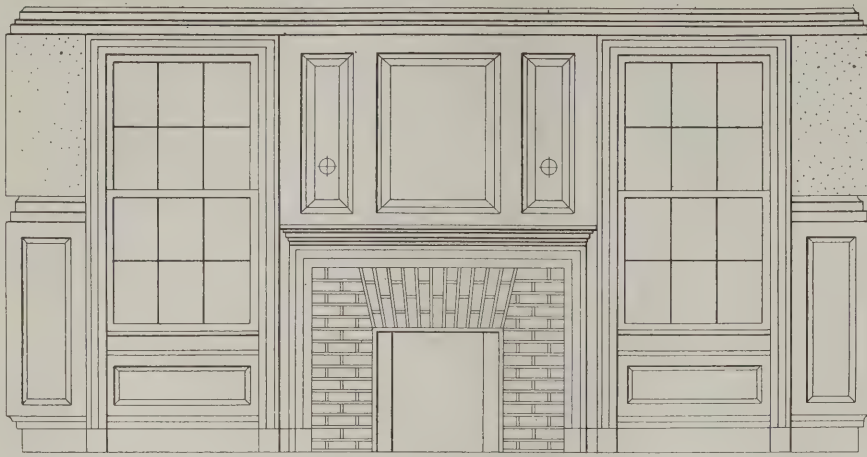
coal. It is interesting to make some further computations from the accompanying table.

The table shows that the 11 warm-air pipes have a total area of 1049 sq. in., that the 12 radiators expose 414 sq. ft. of heating surface, that the building contains 33,104 cu. ft. of space and exposes a total equivalent glass surface of 1466 sq. ft. if 4 sq. ft. of wall surface is equal to 1 sq. ft. of glass surface. Further analysis shows that 10,553 cu. ft. of the space and 560 sq. ft. of the equivalent glass surface is in the part of the building heated by the hot-water radiators and that 22,551 ft. of space and 906 sq. ft. of equivalent glass surface exposed is in the portion of the

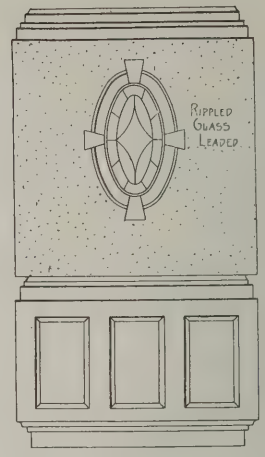


building that is heated by means of warm air.

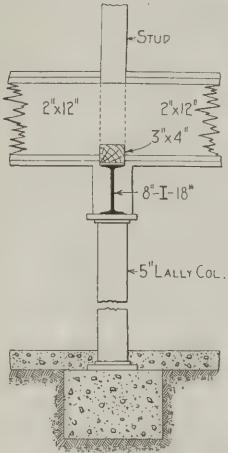
It is further pointed out that the temperature of the air from the registers and of the water circulating through the radiators has varied in accordance with the way the furnace has been fired from 100 deg. to 160 deg. in extremely cold weather and in ordinary freezing weather at a temperature of about 130 deg. As the



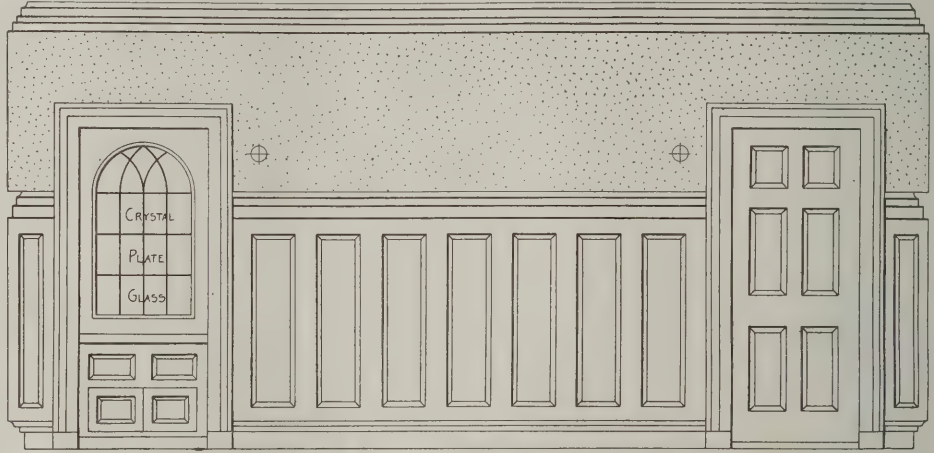
Elevation of North Side of Dining-Room, Showing Open Fireplace—Scale $\frac{1}{4}$ in. to the foot



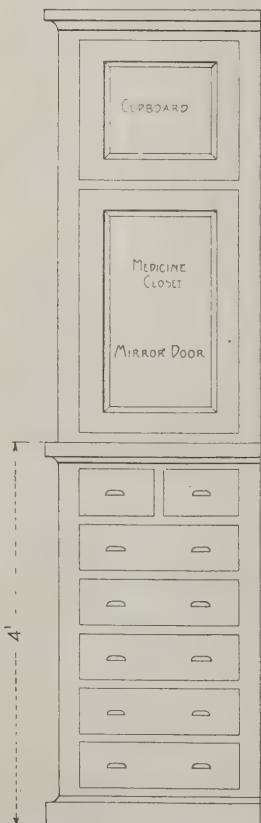
One side of the Vestibule—Scale $\frac{1}{4}$ in. to the foot



Section through Girder in Cellar—Scale $\frac{3}{8}$ in. to the foot



Elevation of West Side of Dining-Room—Scale $\frac{1}{4}$ in. to the foot



Elevation of Case in Bath Room—Scale $\frac{1}{2}$ in. to the foot



Elevation of West Side of Front Hall Showing Main Flight of Stairs—Scale $\frac{1}{4}$ in. to the Foot

temperature of the air increases the velocity of the outflow from the registers will increase and under the temperature of 130 deg. it has been found to be about 250 ft. per minute.

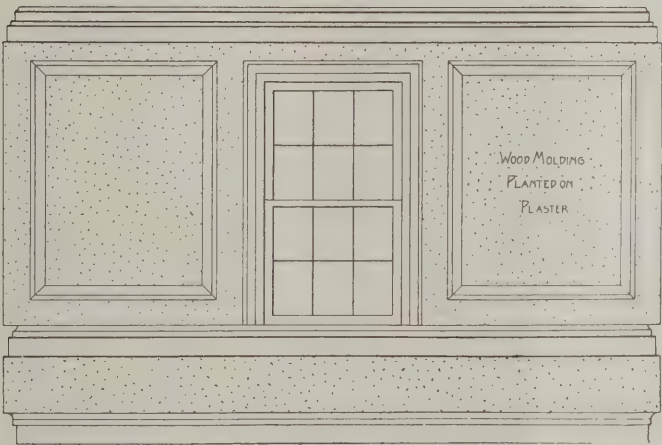
It is interesting to note further the features of the construction of the heaters. The fire-pot consists of what might be termed a cage, or of a series of vertical grate bars, allowing air to enter the fuel chamber all around the outer circumference in a quantity to insure complete combustion.

These fire-pots are 27 in. in diameter so that each furnace has a grate surface of practically 4 sq. ft. and the two furnaces have 8 sq. ft. of grate surface. When but one furnace is in use the proportion is 1 sq. ft. of grate surface to

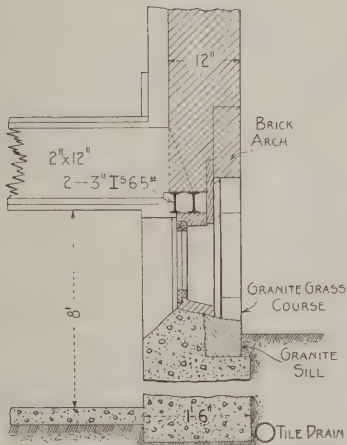
8276 cu. ft. of space heated and to 367 sq. ft. of equivalent glass surface. When both furnaces are in action

TABLE OF DIMENSIONS OF RESIDENCE AND HEATING SYSTEM

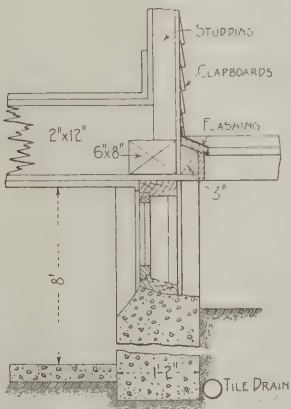
	Dimensions, Ft.	Contents, Cu. Ft.	Wall Exposure, Sq. Ft.	Glass Exposure, Sq. Ft.	Radiators, Sq. Ft.	Register Dimensions, In.	Warm-Air Pipe Dia., In.	Area, Sq. In.
Living room.....	19 x28x9	4788	462	132	....	12x17 12x14	12 10	113 78
Reception room.....	10 x13x9	1170	171	36	....	12x17 10x14	12 10	113 78
Toilet room.....	5 x 9x9	405	26	10	15	....	....	....
Dining room.....	18 x19x9	3078	257	76	....	14x18	13	133
Butler's pantry.....	7 x13x9	819	55	8	....	8x12	8	50
Servants' dining room.....	8 x12x9	864	....	36	40	....	....	....
Hall.....	19 x22x9	3762	153	18	....	12x17 12x17 12x17	12 12 12	113 113 113
Owner's chamber.....	18 x19x9	3078	273	60	....	12x17	12	113
Dressing room.....	10 x11x9	990	174	15	40	....	....	....
Owner's bath room.....	7 x10x9	630	51	12	36	....	....	....
Daughter's chamber.....	14 x15x9	1890	131	40	....	10x14	10	78
Guest chamber.....	16 x18x9	2592	246	60	....	12x15	11	95
Bath room No. 2.....	7 x 9x9	567	55	8	30	....	....	....
Son's chamber.....	13 x15x9	1755	102	60	60	....	....	....
Guest chamber, No. 1.....	11 x16x8	1408	114	12	....	8x12	8	50
Guest chamber, No. 2.....	16 x16x8	2048	292	36	65	....	....	....
Servant's chamber, No. 1.....	7 x14x8	840	160	12	28	....	....	....
Servant's chamber, No. 2.....	7 x12x8	720	48	12	24	....	....	....
Servant's chamber, No. 3.....	8 x12x8	816	152	12	28	....	....	....
Servants' bath room.....	8 x 7x8	476	49	9	24	....	....	....
Guests' bath room.....	8 x 6x8	408	56	72	24	....	....	....
Total.....		33104	3167	676	414			1049



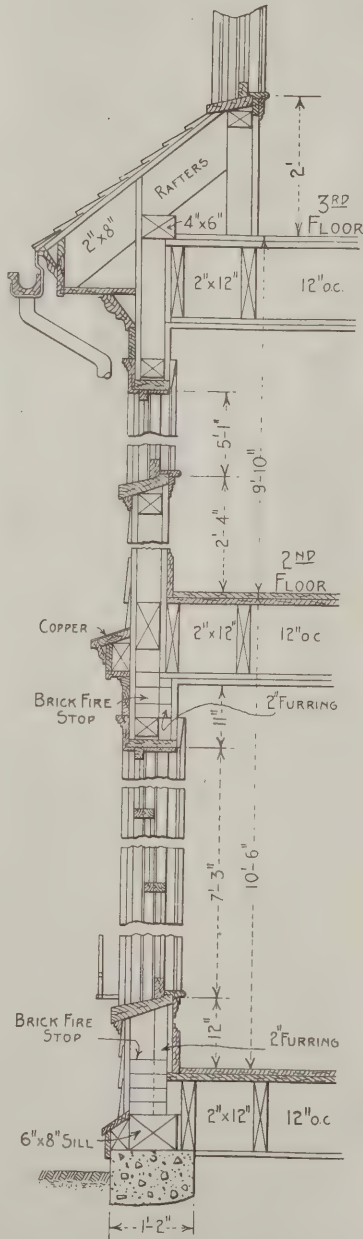
View of West Side of the Reception Room—Scale ¼ in. to the foot



Section through Wall between Chimney and Outside Cellar Stairs—Scale ¾ in. to the foot.



Section through Water Table—Scale ¾ in. to the foot



Section through Main Wall of House—Scale ¾ in. to the foot

and 8 sq. ft. of grate is in use the proportion is 1 sq. ft. to 4138 cu. ft. of space and to 183 sq. ft. of equivalent glass surface.

The coal burned bears a proportion of 1 ton to 1655 cu. ft. of space heated and to 73 sq. ft. of equivalent glass surface.

Warm air is used for heating 22,551 cu. ft. of space and for 906 sq. ft. of equivalent glass surface so that the warm-air pipe area bears a proportion of 1 sq. in. to 21.5 cu. ft. of space and to 0.86 sq. ft. of equivalent glass surface.

The hot-water radiators expose a surface of 414 sq. ft. and bear to the 10,553 cu. ft. of space heated and the 560 sq. ft. of equivalent glass exposed a proportion of 1 sq. ft. to 25.5 cu. ft. and to 1.35 sq. ft. respectively.

The equivalent glass surface that must be taken care of by the hot-water radiation would lose in maintaining a temperature of 70 deg. indoors with an outdoor temperature of zero 47,600 heat units, requiring an emission of about 115 B.t.u. per square foot. The emission from the 906 sq. ft. of equivalent glass sur-

case repairs are costly and frequent. Furthermore, there is not the ease of attaching machines, while other objections include the affect of the floor on the health and comfort of the operatives.

In looking over the construction of the important textile mills during the last 12 or 18 months, it will be generally noticed that the construction of the upper floors consist of an underflooring of 4-in. hard pine with a top of $\frac{7}{8}$ -in. maple with an intermediate flooring of $\frac{7}{8}$ -in. pine. The general practice is to lay the top flooring and the under flooring the length of the building, while the intermediate flooring is placed diagonally with ordinary building paper between. This form of construction prevents only dust and not water from going through, and it is useless from a waterproofing standpoint. When the floors are over the carding room, or when the cloth room is located in the picker house, such floors have been made waterproof by using felt and bituminous composition.

One of the most efficient and best methods of waterproofing these floors is to use an impervious felt, such as "Hydrex" felt, a very tough and elastic waterproof felt made especially for this purpose, and so treated after saturation as to be in itself absolutely impervious to water. This waterproofing is placed between the top flooring and the intermediate flooring. Two sheets of the felt are customarily used, being cemented together with an elastic hot compound which snugly and tightly fills all nail points. Each sheet is lapped 19 in. over the preceding sheet of waterproofing, being turned up 2 in. at walls and openings, and also around columns, pipes, etc. At times to insure better results as each plank of the top floor is laid the hot compound is spread under it and over the felt already in place, making the joints between the top flooring itself practically water-tight.

It is reasonable to expect that in the near future a larger extent of floors in textile mills will

be waterproofed in this manner, inasmuch as the cost of the same is almost negligible as compared to its value and the cost of the structure. The use of improper waterproofing material is simply a waste, for experience shows that tar and tar paper soon dry out when open to the atmospheric and temperature changes, become brittle and go to pieces earlier than when used in almost any other condition. In cold weather such materials soon fracture away, especially at nail points, allowing water to pass through.

Mastic or asphalt floors have served effectively for some time, but have failed when a true test came. This sort of a floor draws away from columns and walls, and when made soft enough not to harden and crack in cold weather, becomes too soft in summer to bear the load of traffic or stored merchandise.

Floors of mill construction waterproofed under the wearing floor with "Hydrex" felt offer more advantages than reinforced concrete or any other type of floor. They cost less, wear better, and are more serviceable in every way. By waterproofing a mill floor the greatest point in favor of concrete is at once secured. Fire underwriters and insurance companies strongly endorse waterproofing floors and make an allowance on the insurance which soon pays for the installation of the waterproofing.



Heating a Country House by a Combination System—View in Main Hall, looking toward the Stairs

face taken care of by the warm-air pipes would be 77,010. It is pointed out that with the aid of the open grate as ventilators there is an air change of at least four times per hour, which would bring into the building over 90,000 cu. ft. of air and at the temperature at which it enters it can be readily seen that enough heat is brought in to offset the losses through the equivalent glass surface and to maintain a comfortable temperature in the rooms in this part of the building.

Waterproofing Mill Floors

One of the most important assets of a concrete floor is the fact that it is waterproof, and in the case of a fire the deluge of water from automatic sprinklers or from the fire department's hose will not go through to the floor below but will be confined to the floor on which the fire occurred and be led off through drains. The losses by water exceed the losses directly by fire even in protected mills. But in spite of this fact, the concrete floor has not been adopted in textile mills for various reasons, such as, its higher first cost, its inability to withstand heavy trucking without dust and becoming cracked, especially at joints. In this latter

CONVENTION OF OHIO BUILDERS EXCHANGES

Seventh Annual Meeting Held in Cincinnati February 11 and 12—
Subjects of Unusual Interest and Importance Considered

SEVERAL matters of unusual importance to the building industry of Ohio, and of more than passing interest to the building fraternity of the entire country, were considered at the Seventh Annual Convention of the Ohio State Association of Builders Exchanges held in Cincinnati, on February 11th and 12th. These included the proposed new code of building regulations to govern building construction in Ohio; an advanced compulsory workmen's compensation law, and a mechanics' and builders' lien law which goes somewhat further than any law yet devised for any of the states. In all of these subjects the association manifested a keen interest and expressed itself in the form of resolutions. The meetings were addressed by the highest authorities in the state on the topics discussed, and the usefulness of the association was demonstrated as an agency for focusing the sentiment of the builders on matters strictly affecting their welfare.

The convention was well attended. In addition to the business sessions a banquet was held in the main dining room of the Grand Hotel, which was one of the largest assemblies of prominent Ohio builders for many years.

The convention was called to order in the rooms of the Cincinnati Builders and Traders Exchange in the Merchants Building at 2:30 o'clock on Tuesday, February 11th, by President C. A. Schuster of Springfield. The rooms were decorated with American flags, palms and ferns. A committee on reception, whose members had greeted the visitors on arrival of trains earlier in the day, was on duty, with cigars to make every one feel at home.

Delegates in Attendance

The roster of delegates showed that all ten of the exchanges in the state were represented, while Cincinnati had a large quota on hand, enlarging the company to nearly one hundred. Following is a list of the delegates:

Alliance—W. T. Miller.
Canton—Charles R. Kumpf.
Cleveland—George A. Rutherford, Fred Epple, John Heiniger, A. E. Brown and Edward A. Roberts.
Cincinnati—A. G. Weist, C. Taylor Handman, Thomas J. Tanner, E. A. Powell and Ed. F. Hanley.
Columbus—John A. Kelley.
Dayton—John W. Boren, Charles E. Slaght, J. W. Clark, C. J. Vehren and F. O. Kemlein.
Elyria—John Kaiser.
Springfield—Guy D. Bayley, H. G. Ridgley, C. A. Schuster, W. F. Morningstar, A. E. Hendrickson, Patrick J. Higgins, T. A. Graham, H. C. White, D. W. Jacoby, A. B. Smith, James J. McHugh, Henry Dixon, R. L. McIntire, W. F. Payne, R. H. Clark, F. A. Graham and Donald Kirkpatrick.
Toledo—L. E. Fishack, Henry Thorspeck, W. J. Albrecht and L. J. Schultz.
Youngstown—J. J. Dalzell.

An address of welcome was delivered by President Weist of the Cincinnati Exchange, who expressed his pleasure and that of the local organization at being honored with the convention. President Schuster responded for the Association.

A telegram of greetings from the Interstates Association of Builders Exchanges, in session on the same dates in Washington, was read by the secretary and a reply reciprocating the friendly expression was authorized.

President's Address

The annual address of the president was then delivered by Mr. Schuster, and from it we take the following:

The past year has been a prosperous one for building interests in general, and indications are that the coming year will be even better than the past. Not only have

the builders been busy all the year, and no doubt have made some money, but we also note a prosperous and progressive movement in builders exchange matters. Most all of the exchanges are taking a forward step, bringing more business features into exchange work, and eliminating features that have been more or less harmful; a better and more advanced feeling of co-operation is manifested and improvements along all lines are noted, which is most gratifying.

The past year has been an important one on account of the amendments to the Constitution of Ohio. Some very important and difficult problems will come before the people for solution, and some of them will affect the builders. So it behooves us to keep our eyes on the legislative enactments that will be proposed. A new Lien Law will be enacted. It is our duty to see that this Lien Law is just to all parties concerned; that it is free from technicalities, and instead of promoting, it should discourage litigation. A new state building code is to be enacted. It is our duty to see that this code, instead of being a cumbersome and expensive measure, should be so framed that it will encourage and promote building instead of discouraging and hampering it, which it is liable to do if not framed right.

The Workmen's Compensation Law needs our careful and studious attention. I believe this law can be so framed that it will be a burden on no one, but a benefit to all concerned. But on the other hand, if left to politicians and professional agitators, it may become so burdensome as to seriously affect the building interests.

Some attention ought to be paid to increasing our membership and usefulness. The State of Ohio ought to have fifty local exchanges instead of a bare dozen. Look over the state and note the cities of 20,000 population and upwards. Each one ought to have its live builders exchange, and all should be united. See the influence they could exert for the betterment of building laws and conditions. Think it over.

Touching the matter of a National Association, I have long contended, and I believe it more firmly than ever, that a National Association made up of local exchanges from all over the country is not and never will be a success. Each state should have its own association of local exchanges, and the National Association should be made up from delegates from the state association. It would thus be a body that would wield more influence because of the power that is behind it, and would be less cumbersome and unwieldy than a body made up of local exchanges.

Builders have too long failed to recognize the old and truthful saying, that in union there is strength. Just stop a moment and consider what a foolish thing it is to think that you must beat your competitor at all hazards, even if you lose money by the deal. How much better plan it would be to recognize the fact that we must all make a living and that there is enough for us all. Then why not join hands with your competitors and all work for the uplift of the business. Put it on a plane where it rightfully belongs. The general public will respect you more, and you will not be up against the hardships that you now endure.

Report of the Secretary

Next in order was the annual report of the secretary, which was presented by Edward A. Roberts. The following extracts are of special interest:

The secretary has prepared a brief review covering some of the activities of our state association for the past year. It is gratifying to note that the association has continued to enlarge both in number of affiliated bodies and in the scope of its work, and that considerable has been accomplished since the last convention for the great industry of building which it aims to represent. While the association now comprises ten active local exchanges and is one of the largest state organizations in the country, there is room for a still larger membership, and we hope the good start that has been made will be followed by the organization of new exchanges and the enlistment of many prominent builders, as individual members, in localities where it is not deemed expedient to form local bodies.

With the help of President Schuster a new exchange was organized in Lima and the exchanges in Alliance and Canton were further strengthened and have good

prospects for the future. The exchange in Elyria has undertaken a revival of interest which is sure to bring that organization into a favorable position as time advances.

The attention of officers of the association has been given largely to matters of state legislation at Columbus, with special reference to the proposed new sections of the state building code, the compulsory Workmen's Compensation Act, and the Lien Law.

Touching the state code, it may be said that our association was well represented at a conference of various interests held in Columbus in December, and that President Schuster was selected as a member of the state executive committee having in charge the investigation of the code, and the assembling of the sentiment of various organizations and lines of business toward this legislation.

A pamphlet was issued under authority of the association early in the year explaining the provisions of the Workmen's Compensation Law enacted at the last session of the Legislature, this pamphlet having been prepared by the secretary, after consulting with legal authorities. Support was given to the movement to test the constitutionality of the law, and this having been established, information was given to the exchanges as to the forms and other details necessary to be observed in order to operate under the provisions of the law. The association has been represented in various conferences at which the Green bill now pending in the General Assembly has been considered, and a large amount of correspondence has been engaged in with the affiliated bodies relating to this measure, which seeks to make contributions to the state fund compulsory.

As for the Lien Law, the association was represented at conferences held at various times during the year.

During the constitutional convention attention was given to the proposed amendments to the State Constitution and addresses were made by representatives of the convention before some of the exchanges. Copies of the amendments were distributed and opposition was expressed especially toward the injunction amendment while support was given to the amendments relating to liens.

I believe that the purpose of our association is better understood at the present time by all of the exchanges than ever before and that there is a disposition to co-operate on matters of mutual interest to a greater extent than ever before. This being the case, there should be every reason for advancing with renewed effort and greater enthusiasm in the work of the coming year. There can be no doubt of the need of such associations as ours if the rights and privileges of employers are to be protected. The tendency of the times is manifestly toward radical legislation. Restrictive measures of all kinds are receiving ready attention at the hands of public officials who seem disposed to cater to extremists rather than to the conservative representatives of business upon which the progress of our state and nation depends. The demonstration made by employers within the last two weeks at Columbus, where trainload after trainload have traveled in opposition to certain features of the Workmen's Compensation Act, shows what may be done in creating sentiment and applying it to state legislation. If the same earnestness could be aroused on all matters affecting employers and could be sustained throughout the year a great deal could be done in preventing the enactment of unjust and hurtful laws and in promoting good ones.

The time will come when employers will realize that their attention cannot be riveted exclusively to their private business affairs without seriously endangering their individual success, and that a portion of their time, talents, and means must be given to the consideration of matters affecting the general welfare, if they are to maintain reasonable conditions for their own operations. It is therefore important that we foster and encourage business organizations of all kinds throughout the state and up-build our own association to the fullest possible extent as an agency for good in the great commonwealth to which we all give our allegiance.

Proposed Ohio Lien Law

Nearly two hours were devoted to an explanation of the proposed Lien Law for the State of Ohio by Lem S. Miller, attorney for the Cincinnati Builders Exchange, who was accommodating enough to answer all questions asked pertaining to the measure. "This act," he said, "is modeled after the Michigan law in its main features. It was prepared under the direct supervision of the Ohio Lumbermen's Credit Association, and has been approved by the labor organizations of the state. It grants the privilege of liens on both building and land or leaseholds from the time the principal contractor starts the operation. These liens may run in favor of material dealers, sub-contractors, as well as the gen-

eral contractor, and mechanics, the last named having priority over all others. The owner is liable for the amount of the contract and may require regular statements from all parties at stated intervals as to amounts of work performed and that remaining to be done. A penalty of \$100 is named in the act for failure to comply with this requirement. The owner is to make payments on sworn statements of the parties to whom such payments are due, and failure to observe this system makes him liable to repayments of such sums as may not be paid by the principal contractor regardless of the amount of the contract."

A report of the committee in charge of drafting the measure was made by F. O. Kemlein of Dayton, who said that in order to avoid conflict with the state constitution an amendment has been submitted by the recent Ohio Constitutional Convention and had been approved by a substantial majority at the election.

Reports from Affiliated Exchanges

A series of reports from the affiliated bodies were given indicating the activities of these organizations. For Cleveland it was reported that building operations for 1912 had totaled \$18,000,000 in value of permits and that 1913 was making a good start to equal or surpass this record. President Rutherford said that capitalists of Cleveland had offered to erect a building for the exchange to be devoted to building contractors and architects, and that this was now being considered. He emphasized the friendly relationship existing between the builders and architects as indicated by the joint committee established to consider matters of mutual interest.

Columbus, through Secretary Kelley, announced the opening of elegant new quarters on the club plan for which \$7,000 had been expended. A noon-day luncheon feature has been established, attracting nearly one hundred patrons each day. Desk and exhibition spaces are now provided for members on the floor directly under the exchange quarters, but not under the supervision of the exchange. Membership is 250.

Dayton, through Secretary Kemlein, reported that a City Building Department had been established as the result of recommendation by the exchange, and that better control of operations had followed this action. Building in all line active; membership 140.

Elyria, through Mr. Kaiser, reported a revival of interest and the completion of a building code after two years' work.

Toledo now has 100 members, as stated by President Fishack. A series of entertainments, socials for families of members, etc., have helped enliven the organization this winter. A desk and exhibition feature has been established in the headquarters located in a leading office building.

Youngstown has started a movement to increase the membership to 100 this year. A new secretary has been appointed in the person of Gordon Phillips. Prospects for building good.

Springfield announced through Mr. Payne that steps are being taken to establish a desk and exhibition feature. Mr. Donald Kirkpatrick has been elected secretary to succeed R. L. McIntire.

Cincinnati surprised the convention by announcing, through President Weist that the membership had been increased in a year and a half from 85 to 187. Considerable trouble is being experienced from labor difficulties in this city, due to jurisdictional strikes. Building operations dropped from \$13,000,000 in 1911 to \$9,000,000 in 1912, but prospects are brighter for 1913.

Alliance Exchange has 34 members, according to Secretary Müller, and is on the upward trend.

Canton, organized a year ago with 23 members, now has 57, as reported by Secretary Kumpf. A social session is held once a month to help along good feeling among the members. A code of estimating was pro-

mulgated by this exchange and has done much good in bettering conditions.

These reports were listened to with much interest and at the conclusion the session adjourned.

The Banquet

In the evening the banquet was held in the main dining-room of the Grand Hotel. The attendance was nearly 200, including many members of the Cincinnati Exchange who were unable to attend the sessions during the day. Flowers and garlands of green decorated the tables, and an orchestra kept the diners in good humor with popular melodies, and an occasional vocal selection, in which the musically inclined heartily joined.

Following the dinner President Weist, as toastmaster, introduced President Schuster, who spoke briefly, congratulating the Cincinnati Exchange on the success of the affair. A somewhat detailed address on the Ohio State Building Code was then made by A. O. Elzner, chairman of the State Executive Committee, representing the builders, architects and engineering societies, and also president of the Cincinnati Chapter of the American Institute of Architects. Mr. Elzner's comments were adverse to many features of the code. He said that architects are now being called upon to devote a great deal of time to the consideration of building regulations. In fact, he stated, these demands were coming to the point where they were interfering with business. He felt that the building world was being burdened with legislation, and that such cumbersome laws as the proposed Ohio code would seriously endanger the industry. The plan of the code embraces eleven parts, some of which are subdivided into at many as twenty titles, making a voluminous document subject to many technical objections. The code requires the issuing of permits by a state board and investigation of all violations by the same board. Mr. Elzner said that efforts were being made to have Governor Cox recommend the postponement of all legislation of the sort for another year, and that the Governor had listened to this suggestion with favor.

An instructive address on the Workmen's Compensation Law was given by Dean Rogers of the Cincinnati Law School, the dean pointing out some defects in the measure as originally drawn. He said that the development of sentiment in favor of compulsory insurance of this kind in the last ten years had been astonishing. While there was much freak legislation going on the statute books, he thought that from all of it some good laws would result. Several informal talks brought the program to a close.

Wednesday's Session

At the opening of the session on Wednesday, the subject of approving the lien bill pending before the state legislature was taken up and this bill was approved by unanimous vote of the convention. Steps were taken to have the views of the builders presented to the proper committees and to the members of the legislature in aid of the movement to have the bill passed as early as possible.

An address on the workmen's compensation bill was then made by Wallace D. Yaple, member of the State Liability Board of Awards. Mr. Yaple said that sixteen states had adopted workmen's compensation laws up to date. All of these laws were optional in character excepting in the State of Washington, where a compulsory measure had been enacted. Heretofore conflict with state constitutions had interfered with passage of laws in some of the states, but in Ohio these objections had been removed by the amendments approved at the recent election on a new state constitution. The speaker said that commissions had been established in Pennsylvania, West Virginia, Indiana, Iowa, Nebraska, Delaware and Kentucky to investigate workmen's compensa-

tion and then report to the state legislature.

As for the Ohio law, Mr. Yaple stated that 921 employers had elected to accept state insurance under the existing law, the number of employees thus protected aggregating 54,750. The sum of \$207,000 had been paid into the state fund in premiums and \$26,455 had been paid out to injured workmen, the claims being presented each week averaging about 180.

Mr. Yaple explained the new bill, saying that it followed in many respects the old law, except that its application is made compulsory on all employers having five or more workmen and optional for all employers having less than five workmen. He claimed that with state management and expenditure for maintenance of the insurance department an equitable system of rates could be worked out which would be of great benefit to all concerned, giving to workmen the entire amount due them without litigation and making the payments by employers go entirely to the purpose for which they were intended.

Resolutions

A resolution introduced by Secretary Kelley of the Columbus exchange, calling upon the state legislature to authorize the erection of a building at the Ohio State University, in Columbus, to be used for the purpose of a trades school for teaching carpentry, bricklaying, plumbing, sheet metal work, painting and other branches in the building trades was adopted by unanimous vote.

The convention also adopted a resolution requesting that the proposed State Building Code be not introduced in the legislature at this session, and that the entire code be reviewed and harmonized before the same is placed before the state lawmaking body. This action was in line with the attitude of the executive committee representing the various organizations of the state.

In response to an enthusiastic invitation by Secretary Albrecht of the Toledo Builders Exchange to hold the next convention in Toledo, the assembly voted in favor of that city for the meeting in 1914.

Election of Officers

The following officers were elected for the ensuing year:

President—John W. Boren of Dayton.

First Vice-Pres.—C. Taylor Handman of Cincinnati.

Second Vice-Pres.—L. J. Fishack of Toledo.

Third Vice-Pres.—Fred Epple of Cleveland.

Sec.-Treas.—Edward A. Roberts of Cleveland.

A motion was made by Secretary Kumpf of the Canton exchange authorizing the president to appoint a committee to consider the advisability of adopting a uniform code of practice in estimating, this code to be generally applicable throughout the state.

A resolution expressing thanks to the retiring officers and also to the Cincinnati Builders and Traders Exchange for the splendid arrangements made for the meeting was adopted by a rising vote.

A speech was made by the new president, who asked for the earnest co-operation of all the affiliated bodies in the work of the new year, and Mr. Bayley of Springfield followed with a lively talk, in which he urged greater interest in public affairs on the part of builders.

The committee of the Cincinnati Builders Exchange having charge of the entertainment of the delegates consisted of A. G. Weist, C. Taylor Handman, Thomas J. Tanner, E. A. Powell and Ed. F. Hanley.

An owner of a building under construction, under a contract providing for payment of the price on completion of the work, who refuses to permit the contractor to complete the work, is liable for the contract price, less payments made, and cannot counterclaim for the amount paid for finishing the building.

ESTABLISHED 1879

THE BUILDING AGE

Formerly CARPENTRY AND BUILDING

Copyright, 1913, by David Williams Co.

Entered at New York Post Office as Second Class Mail Matter

Published Monthly by the

David Williams Company
239 West 39th Street New York

W. H. Taylor President and Treasurer
Fritz J. Frank Secretary
M. C. Robbins General Manager

Henry Colwell, Editor J. B. Bennett, Business Manager

Editorial and Business Staff

New York Main Office—Frank Meyers and John A. King, advertising.
Philadelphia, Real Estate Trust Building—A. A. Miller, editorial.
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Buffalo, Erie County Bank Building—Ira B. Littlefield, editorial.

Subscription Rates: To all parts United States and Mexico, \$1.00 a year; to Canada, \$1.25 a year; to all other countries, \$2 a year.

March, 1913

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The Proposed Ohio Lien Law

The meetings which are held from time to time by leading organizations of contracting builders and others allied with the building industry, afford excellent opportunity for a consideration of matters of vital interest to them individually and collectively. A case in point is that of the recent convention of the Ohio State Association of Builders Exchanges held in Cincinnati, where the delegates were addressed by the highest authorities in the State of Ohio, on the topics discussed and the usefulness of the organization was demonstrated as an agency for fixing the sentiment of builders on matters strictly affecting their welfare. One of the special topics which came up for consideration and one of great interest at this time was the proposed Ohio lien law which goes somewhat further than any law yet devised for any of the states. Among other things it grants the privilege of liens on both a building and the land or leaseholds from the time the principal contractor starts the operation. The liens may run in favor of material dealers and sub-contractors as well as the general contractor; also in favor of the mechanics, and the latter, it must be noted, have priority over all others. The owner is liable for the amount of a contract and may require regular statements from all parties at stated intervals as to the amount of work performed and that remaining to be done. Another topic which received serious attention at this convention was that of workmen's compensation laws and what is presented in another part of this issue on this topic cannot fail to command serious consideration on the part of builders everywhere.

The Public Library and the Workman

The public library can be made a valuable auxiliary in the shop training of boys, as in the cities and many of the towns the more important technical papers are to be had at the reading rooms. Not only is he assisted in his education in matters pertaining directly to his work and the tools and machines he operates, but he is taken into the atmosphere of the best organized shops and is given an intelligent idea of management and system. He is removed from the danger of acquiring the narrow viewpoint characteristic of a great many of his associates, especially the older men, from whom he is likely to absorb a prejudice which may be hard to overcome later. One of the great barriers between the employer and his workmen is that of employees' ignorance of many things of which they often assume to know. Take, for example, the matter of costs. The average workman figures an extraordinary profit on work which he is assisting to produce. He adds together the cost of material and that of labor, concerning which he has some knowledge, and forgets entirely the fact of overhead cost, of which he has scant realization. The strong prejudice which exists in some places against the bonus or premium system is based entirely on a lack of comprehension on the part of the men. Such matters are given much careful attention by the technical journals for the benefit of both the owner and the men in his shop. In some establishments the papers are regularly on file and are

available for the use of employees in all departments. Where this is not done it is an easy matter to suggest to the apprentice and other beginners—in fact, to everyone in the shop—that they would find it worth while to drop in at the library and look over the current literature which has to do with their employment. That many men avail themselves of this opportunity is apparent to all who have occasion to visit the reading rooms of the libraries, for certain journals are in almost continuous use.

Thatched Roofs

One of the latest tendencies in the architectural treatment of dwelling houses is to give them the appearance of being covered with thatched roofs, or at least roofs that look as though they were thatched. The effect is produced by using shingles of various lengths, the ends being cut diagonally and all fitted together so that as the ends meet they form continuous wavy lines. The effect is easily obtained and the added cost of such a roof so slight as to be a negligible factor. The effect is rather pleasing on almost any house, but it is especially so on a house having a roof of especially large area. By means of the shingle thatch the monotony of a large plain roof is minimized.

Architectural League Medals and Prizes

Just before the opening of the annual exhibitions by the Architectural League of New York it has been customary to give a dinner and at the same time announce the award of prizes. At the dinner given on January 31, prior to the opening of the twenty-eighth annual exhibition, the Architectural League medal for sculpture was awarded to A. A. Weinman for his statue of Abraham Lincoln for the rotunda of the capitol at Frankfort, Ky. The New York Chapter medal for architecture was awarded to Cram, Goodhue & Ferguson for their church work, while the collaborative prize of \$300 offered by the League for the best design submitted by architect, sculptor and mural painter in collaboration was awarded to Kenneth M. Murchison, architect; Charles Sarka, painter, and Leo Lentelli, sculptor, the subject being a waiting room for a railroad station. The Avery prize of \$50 for sculpture in memory of the late Henry C. Avery was also awarded to Mr. Lentelli. What is known as the President's medal was awarded to Col. G. W. Goethals in recognition of his work in connection with the Panama Canal.

New Theater with Many European Features

Notwithstanding the multiplicity of theaters and places of amusement of which the metropolis can boast, another to cost half a million dollars is to be erected in the Long Acre Square section of the city. Plans have just been filed for a theater, store and office building which will occupy the site of the late Brewster carriage factory at the northwest corner of Broadway and Forty-seventh Street. It will have a frontage of 155.7 ft. on Broadway and 265.2 ft. on the street. According to the plans of Architect Thomas W. Lamb, the building will be three stories high and will have a facade of white terra cotta in the Italian renaissance style of architecture. The amusement portion of the building will combine features of the famous winter gardens in Berlin and Vienna, London's music halls with their promenades and New York's own places of amusement—a theater,

rathskellar and a roof garden. The pleasure resort when completed will house three distinct audiences at one time, having a seating capacity of about 7,000. The rathskellar will have a ground floor area of 20,000 sq. ft. and the roof garden will have a seating capacity of 2,000. It will be reached by five elevators of the plunger type and two moving stairways. The theater proper will be situated in the center of the plot and will have a stage 40 ft. deep by 115 ft. wide. Its seating capacity will be 3,126. The theater will be reached from Broadway by an imposing lobby 30 ft. in width and 65 ft. deep. It is said to be the intention at present to equip the theater with the largest organ ever built in America, which will have every effect known to an orchestra. The work of demolishing the old Brewster factory has already been commenced, and it is hoped to have the new building ready for occupancy some time in October next.

Builders' Wages in New South Wales

According to the secretary of the Master Builders Association of New South Wales, the following is the minimum rates of wages expressed in United States currency for workmen in various branches of the building trade:

Stonemasons	40 cents per hr.	44 hrs. per week
Bricklayers	36 " "	48 " "
Carpenters and Joiners...	33 " "	48 " "
Plumbers and Gasfitters...	33 " "	48 " "
Plasterers	33 " "	48 " "
Painters	32 " "	48 " "
Slaters, Tilers and Shinglers	36 " "	48 " "
Laborers from	24 to 28 " "	48 " "
Crane Drivers	36 " "	48 " "
Hoist Drivers	28 " "	48 " "
Rubble Masons	36 " "	48 " "

By comparing these figures with the table of wages prevailing in the building trades in leading cities of the United States and published in these columns a few months ago some striking differences will be observed.

Estimating Cost by the Cubic Foot

In discussing the cost of the Bungalow forming the basis of our cover design in February it was inadvertently stated that the house was figured on the basis of 15 cents per square foot, whereas it should have read *cubic foot*.

The proceedings of the Ontario Association of Architects, embracing transactions of a special meeting and of the twenty-third annual convention, has just been issued in the form of a volume of 68 pages of text and 23 plates of illustrations. There is also a list of officers of the Association for 1911-1912; the various committees appointed covering the same period and a list of members revised up to August 7, 1912.

J. H. Laurie, a prominent building contractor of the city of Detroit and member of the Builders' Association of that city and of the Michigan State Association of Builders, recently died in Ann Arbor, Mich. During the 25 years which he had been engaged in the contracting business in the city of Detroit he had served a term as president of each of the organizations referred to.

Building operations in Waco, Texas, for January amounted to a little more than \$170,000, which was nearly twice the value in the same month last year.

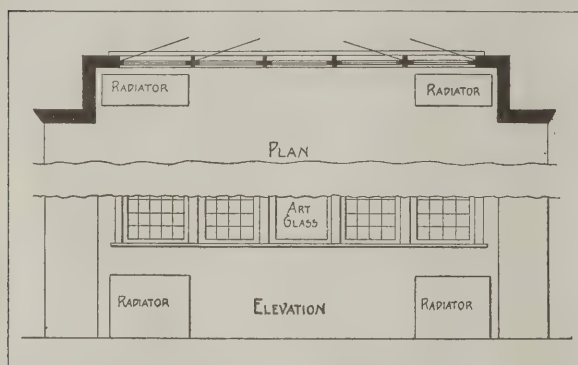
Builders in Indianapolis, Ind., and vicinity are enthusiastic over the building prospects and expect a better general building season than ever before.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

Building Window Seat Over Radiators

From O. R. M. G., Chicago, Ill.—I have a condition in my home which I am puzzled in overcoming. I wish to put a window seat in a bay window. The bay is a square one about 11 ft. long and 18 in. deep with five windows running full length, two on each side being casements swinging out, as shown in the plan, while the middle one is stationary and of art glass, as indicated in the partial elevation. In each corner of this



Building a Window Seat Over Radiators

bay is located a radiator taking about 30 in. of space each. The sketches which I enclose represent a plan and elevation of the bay window showing the position of the radiators and of the several windows.

I did intend to build a seat clear across and over these two radiators, leaving the front space entirely open, but the heating contractor told me that this would affect the radiating capacities of the radiators, unless I put holes in the seat over them, which would look bad. I then thought of putting a seat between the two radiators, but this would leave the latter open and just in the way of the windows out of which one would wish to look, while at the same time it would leave an empty space on each side of the seat.

What I want to know is this: would a seat clear across and over the radiators affect their heating capacities? If so, how can I build a seat and make use of the space occupied by the radiators at the same time? Any suggestions which can be given by the practical readers of the paper will be very highly appreciated, as I wish to make the bay window look attractive, it being in the dining room.

I do not want to change the position of the radiators as this would prove too expensive.

Advice to the Ambitious Carpenter

From F. H. S., Athol, Mass.—The letter from "R. L.," Winona, Minn., which appeared in the February issue of the paper appeals particularly to me as I am in about the same fix as himself—perhaps a little more advanced and my advancement is due to study of my work and to an ambition to reach a place in the architectural end of the building field.

My advice to him would be to take up a trade (night) school course or a correspondence course in building construction or drawing, or whatever the line he wants to follow. There are older carpenters who scoff at the "book carpenters," but "R. L." can see for himself that it is the man who knows the arithmetic of his job who gets along. The writer is studying a correspondence course in architecture and working at the trade. Just now he is very much inclined to think he will make good this year and exchange the bench for the drafting board. It is nonsense for one to drive nails for a living when he has it in him to do something better. All such are wanted higher up.

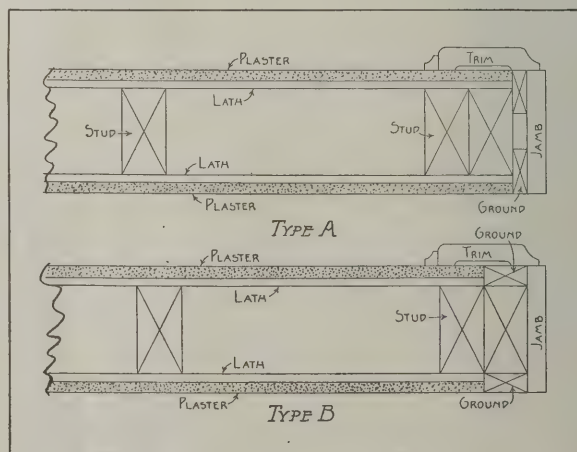
Seasoning and Curing Cherry Lumber

From D. P. B., Redford, N. Y.—I would say to "R. H. P.," Portland, Ore., whose inquiry appears in the December issue of the paper, that it is very difficult to say just what is best for his climate. If it is not too damp I should saw the logs and pile them up under a roof with 1 x 1 in. pieces between each layer of boards, keeping the 1 x 1 in. pieces exactly over one another so as to prevent bending and warping.

Let the wind blow through it a few weeks. Then pile it in the same manner overhead around his shop stove but not close enough to do any scorching. Any kiln drying hurts the polish. A few weeks of this treatment will fit it for use. Planing will greatly advance each process.

Proper Method of Applying Trim

From C. N., New York City.—Herewith find sketches of two types of grounding a doorway, and would like



Proper Method of Applying Trim—Contributed by "C. N."

to know from some of the readers who have used both methods wherein one or the other is to be preferred.

In type "A" it will be noticed that use is made of a $\frac{5}{8} \times 2$ in. ground nailed against the face of the door buck. In case the carpenter in setting his finished

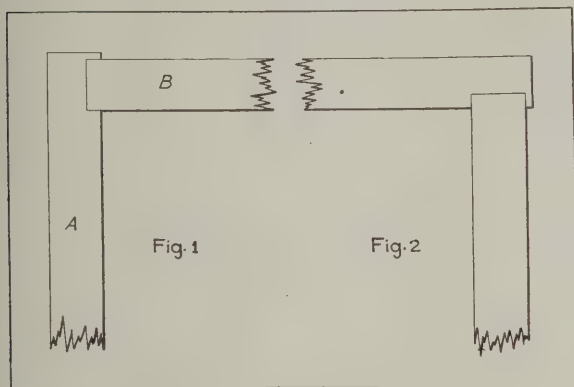
jamb finds that it has not enough room between his studs he can remove these grounds, thereby giving himself room for blocking and plumbing. It is also a saving in labor and material over the system shown in Type "B."

In type "B" there is a $\frac{7}{8}$ x 2 in. ground nailed on to the door buck, which has to be either dressed off or blocked out to suit the condition of the studs, which are rarely if ever straight.

Birch trim is to be used of a design similar to that indicated in this sketch and the point in question is whether there will be any more chance of the trim warping in the one type than in the other; provided, however, that both are equally well nailed.

Constructing an Ordinary Door Frame

From W. E., Brandon, Manitoba.—I am sending a sketch representing a portion of a door jamb and head



Constructing an Ordinary Door Frame

and would like to ask some of the readers to tell me which in their opinion is the best way to construct an ordinary inside frame when the partition is of studing, lath and plaster.

Should the head "B" be let into the jamb "A" as in Fig. 1 or should it be done as indicated in Fig. 2? I have seen more carpenters do it as shown in Fig. 1 than the other way, but I fail to see the advantage of having to move the long jambs to and from the bench when the head can be housed at both ends to receive the upper ends of the jamb.

Stacking Lumber

From W. S. C., Pasadena, Cal.—There is this objection to the plan of "O. B. M." for stacking lumber as shown in Fig. 1 of his article in the January issue of *The Building Age*. My observations have been that if you stick green lumber so that it lies straight in the pile it will be straight when seasoned.

The distance between sticking pieces on either side of the pile is so great the pieces will sag, especially in thin lumber. Only a possible one-third of the boards at the sticking tier lie straight in this way of piling.

I do not agree with "O. B. M." in either of the schemes Nos. 1 or 2 that they will give full opportunity for the admittance of air while preserving the form and affording thorough seasoning. The only way to get thorough seasoning is to stick between every tier.

The article of "O. B. M." in the issue of the paper for December, 1911, page 656, Fig. 3, illustrates the best way to season lumber. I have this criticism to make of the center girder: it should be moved either to the back or front under sticking pieces and another girder put in under the other tier of sticking pieces, then the weight of the lumber above will not make the lower tiers of boards crooked over the girder.

In order to obtain the best results always have the front of the pile a few inches higher than the back so

water will run off. Stick between every tier of boards and carry sticking up in direct line over girders, keeping the sticking pieces one above the other to the top of the pile. Do not space the girders so far apart that the boards will sag between them.

A Question in Framing

From J. F. M., Los Angeles, Cal.—I notice in the January issue of the paper that the editor invites all of us to take part in the discussions of the Correspondence Department of the paper. I have been thinking that if every subscriber would ask a question each month in regard to his work; reply to some inquiry already printed, or tell about some "kink" or "wrinkle" which he had used in his work, what a wonderful paper it would be for information. I for one will promise to send in twelve questions for the year if other readers will do the same. I will start with this one:

In building a tower 30 ft. square and a run of 6 in. per foot—the incline is both ways—what is the proper cut for the foot of the posts to set correctly on the foundation at the corners; also what is the side cut?

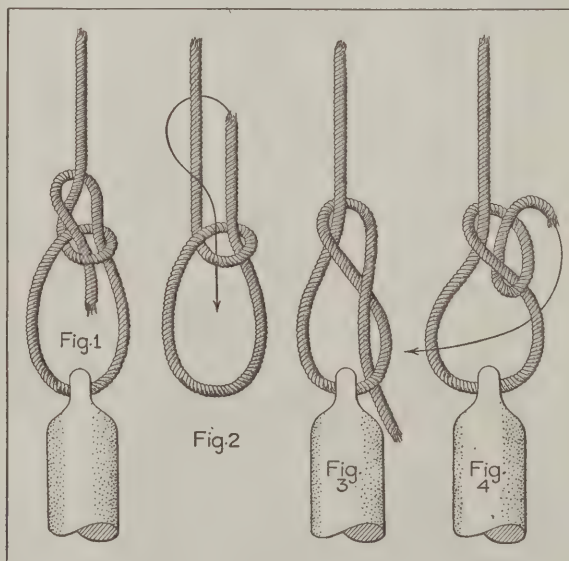
Knot for Sash Cord

From Edward H. Crussell, California.—In reply to "Carpenter," Sheridan, Wyo., I am assuming that the knot for fastening the cord to the sash weight is the one he requires and am sending sketches for three different methods.

Fig. 1 shows the justly celebrated bowline knot. This is probably the most lasting knot that can be used for the purpose, but not all men can learn to tie it readily. Fig. 2 explains the method of tying it. I would mention that it usually requires some little practice to become perfect at it.

The knot shown in Fig. 3 is the most simple and easiest of all. It is our old friend the "timber hitch" in a new role. There is no danger of this knot becoming loose if a proper amount of end is left projecting.

In Fig. 4 is shown a running knot. The free end of the line is left a little long and is taken through between the knot and the weight, as shown by the arrow, after which the knot is slipped down tight. The



Knot for Sash Cord—Styles Suggested by Mr. Crussell

writer has used all of these knots for sash cord at different times and does not recall an instance where the knot did not outlast the cord.

Note.—We have received from "J. B.," New York City, a sketch showing a knot for sash cord similar to that illustrated in Fig. 3 above.

From W. D. S., Tullahoma, Tenn.—For the benefit of "Carpenter," Sheridan, Wyoming, whose inquiry appeared in the January issue of the paper I am sending a brief description of a good knot for the sash cord which I have used for the past 40 years and never had one come untied. Put the end of the cord through the hole or eye in the weight far enough to wrap the end twice around the cord; then put the end underneath the two rounds and then up beside the long part of the cord. Pull it tight with a pair of nippers; then draw the cord tight and slip the knot down hard on the end of the sash weight. This kind of a knot allows the sash weight to hang plumb and not drag the pocket of the window frame.

Plan Wanted for Brick Postoffice Building

From T. P., Housatonic, Mass.—Will some of the readers of the Correspondence columns of *The Building Age* give me a plan of a good-looking brick building to be used as a postoffice. The building is to be conspicuous from all sides and the floor space will be about 20 x 40 ft.

Plans for a Wayside Inn

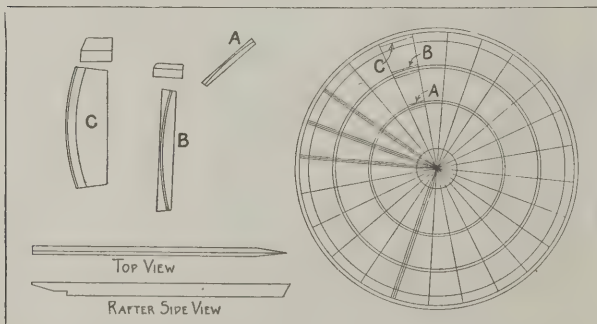
From J. C. B., Dowagiac, Mich.—Referring to the comments of Mr. Barry on page 30 of the January issue of *The Building Age* relative to my request for plans for a Wayside Inn, I would say that at the time I sent the letter I had in mind a plain, modest, well-proportioned structure, with accommodations for five or six guests, together with the necessary help and garage room for two or three automobiles.

Plans for House for Corner Lot

From W. P. A., Saskatoon, Sask.—I would like to say to "R. W. A.," Union City, Pa., whose inquiry appeared in the February issue, that if he will give the size of his lot and direction he desires the house to face, one might better be able to furnish him with the plans he requires.

Roofing a Round Silo

From Builder, Redford, N. Y.—It would have been better for those who desired to reply to his inquiry if "R. L.," Brookville, Ind., had given the diameter of his silo and the pitch of the roof. I would say, however, that the outside or cornice end is cut like any other rafter except the projection should be cut for horizontal plancier, assuming that the silo is 16 ft. in diameter and the rafters 2 x 5 in. and placed 2 ft. apart at the staves. At the center assume a circle as many inches circumference as the silo is in feet. This will



Roofing a Round Silo—By Builder

give a circle about 15 in. in diameter, which will be the horizontal point to bevel the point of the rafter which will be the cut on the plumb line and to the center of the rafter on each side, as shown in the details presented herewith. From the small circle to the center should be filled by the beveled rafters.

Cut "C" between the outside or projection of the rafters after circling the outside edge. The outside points of the rafters should be $1\frac{1}{2}$ in. thick vertically. The part "C" is placed flush with the under cut of the rafter and will project $\frac{1}{2}$ in. above the top of the rafter. Scribe this and shave to the inside circle and a gauge mark on the outside edge.

Place "A" and "B" in position with the circles flush with the top of the rafter. Scribe and shave to the circle, keeping them absolutely horizontal. Board them as the rafters run and nail near the circle. Be sure and get good patterns. The rest can be done on the bench.

Soap Shelf for Kitchen Sink

From S. A. C., Bronx, N. Y.—I am sending some sketches of a simple soap shelf, Fig. 1, which I have made and put up in my kitchen, placing it in relation to the sink as indicated in Fig. 2 of the drawings. I am inclined to think that some of the readers may be interested in a "kink" of this nature, more especially

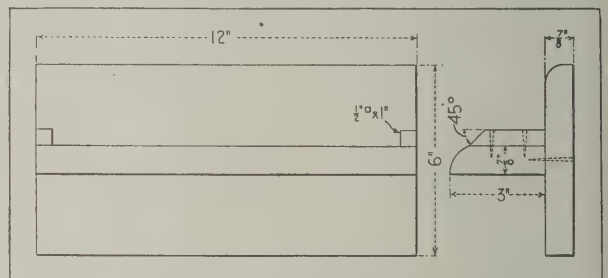


Fig. 1—Front and End Elevations

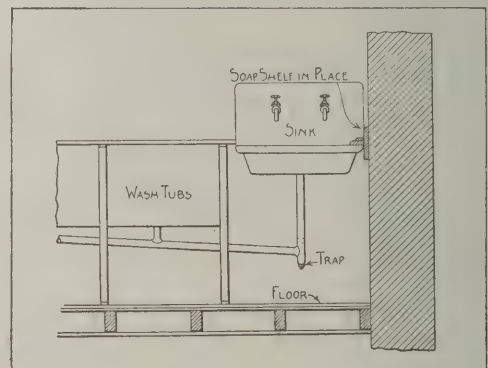


Fig. 2—Showing How It Is Used
Soap Shelf for Kitchen Sink

those residing in flats the same as myself. Everybody knows that space in flats is at a premium, so to speak, and any little convenience of this kind is oftentimes a great help. The kitchen sink is put an inch or so from the wall and the housekeeper is at her wit's end to know where to put the soap in order to have it handy for use. My wife says that the little shelf here shown is a great improvement to her kitchen and I hope it may be to others.

In making the shelf I would suggest the use of spruce throughout with the exception of the $\frac{1}{2}$ -in. strips which may be of white pine, as this does not split so easily when nailing the boards together. The piece against the wall is made $\frac{3}{8}$ of an inch thick with the front edge at the top rounded off the same as is the shelf itself. I used wire nails in fastening the parts together.

Preventing Tools from Rusting

From San Francisco, 1915.—Replying to "A. V. B.," De Pere, Wis., I would say that almost any kind of oil will prevent tools from rusting, although my own preference is for sperm oil.

It does not depend so much upon the kind of oil as

upon the care that is taken of the tools. In order to keep bright steel tools from rusting it is necessary to clean them off with an oil rag as soon as they become wet—not after the moisture has dried and the rust spots have started. This is one case where an ounce of prevention is worth a pound of cure, for it is much easier to keep bright steel clean than it is to keep it clean after it has once become rusty.

Where there is danger of the tools becoming rusty from being stored away some time in a damp place, the best and handiest preservative is vaseline, a small box of which should be in every mechanic's tool box.

From B. J. P., Rolfe, Iowa.—I noticed in recent issues in the Correspondence Department different methods of keeping carpenters' tools from rusting, and wish to say that I have not found anything that would compare with what is known as "Three-in-One" oil. It is thin and light and a little goes a long ways—36 to 48 oz. will keep a set of carpenter's tools in fine shape for a year. When using tools an application once or twice a day with a rag or some waste saturated with this oil will keep them in fine shape. It will also make saws run easier and keep them from sticking when sawing pitchy lumber.

Some years ago I started to work on the Pacific Coast in the winter season. The carpenters out there said my tools would have a different appearance by summer time, as the salt air in combination with much rain during the winter months would soon make them look red. A proper application of Three-in-One oil, however, kept them in the finest of shape and in appearance like new tools.

From Matt Riley, Sturgeon Bay, Wis.—Looking over the January issue of the paper I notice an inquiry from "A. V. P.," DePere, Wis., for a rust preventative for tools. My advice is to take sheet lead such as is used for lining tea chests, or in case this is not easily procurable, take any ordinary lead and with it rub the tools as though scouring them. This will form a thin coat or glaze on the steel that makes a good water protection.

I have known old-time timber framers to carry a wad of this tea lead on the job at all times and to rub up their saws, chisels, squares, etc., all of which they kept bright without losing any apparent time.

Finishing Window Frames of Oregon Fir

From F. H. S., Athol, Mass.—In getting out window frames we make use of a considerable quantity of Oregon fir and I would like to ask some of the readers of the paper to tell me how to smooth up those places where the grain runs in two directions. I have tried planing but that only smoothes it one way and then "digs in" the other way. I would like to echo the views expressed by a contributor in a recent issue and would say "Boost the Correspondence Department."

Hanging Three-Butt Doors

From W. N. B., Martins Ferry, Ohio.—For the benefit of "C. R.," Appleton, Wis., whose query appears on page 30 of the January issue of the paper, I would say that I always hang all sash doors on three butts, placing the top hinge 8 in. from the top of the door to the top of the hinge. The bottom hinge I place as near the center of the lower panel as I can or just above the plinth block, so as not to cause a split in the end of the casing by striking the nail. The center hinge I put in the center between the top and bottom hinges.

From Joiner, New York.—The best place for the third butt is opposite the door knob when it can be done. Most details which are furnished leave out the butts as though the doors could swing without them.

Finding Lengths and Bevels of Rafters

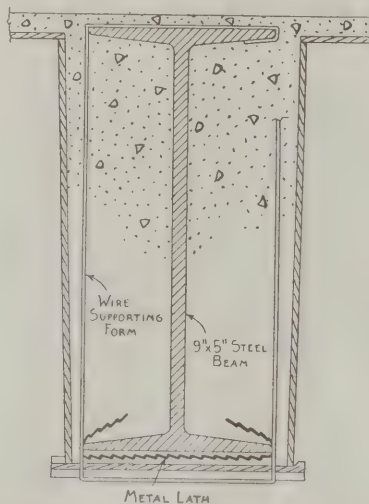
From F. S., Grand Rapids, Mich.—I would take it as a favor if some of the readers of the paper would give me, by the system of drafting, a method of obtaining the lengths and cuts of hips, valleys, jacks and cripples of an equal pitched roof.

Supporting Forms for Concrete Beams

From R. T. W., Montreal, Canada.—Will some expert on the subject tell me the gauge of wire or iron rods required to support the "forms" for concrete beams. The wire supports are to be placed 2 ft. on centers as shown in the accompanying sketch. The wire is to be bent around the top edge of the steel beam as shown.

Answer.—In order to hold the forms in place around a 9-in. steel I-beam as indicated in the sketch of the correspondent a No. 6 wire should be used.

A No. 8 wire can be used with a higher stress, but for such work a wire is seldom satisfactory, owing to



Supporting "Forms" for Concrete Beams

the difficulty experienced in attempting to draw it tight so the bottom of the form will be in a straight line and be truly horizontal.

The correspondent will obtain better results by using bolts hooked over the edge of the lower flange and projecting through the bottom boards, the nut working against a washer regulating the distance of the lower board from the bottom of the flange. The bolts may be $\frac{1}{2}$ in. diameter. When the forms are removed it will be necessary to cut off the ends of the bolts projecting below the beams.

There should be some wire lath around the lower flange of the I-beam to retain the concrete for the reason that the face is too broad without this lath. It is difficult to get the thin mortar to flow under the flange and unless the lath is there a slight blow will make it fall away.

ERNEST McCULLOUGH

Design Wanted for Combination Bookcase and Writing Desk

From C. H. B., Kingston, Pa.—Will some reader of the paper who has constructed an article of this kind furnish for publication a design of a combination bookcase and writing desk in the Mission style?

Best Method Laying Red Cedar Shingles

From Country Carpenter, Kamrar, Iowa.—Will some of the many readers of the Correspondence columns of *The Building Age* give me their views as to which is the best method of laying red cedar shingles—to soak them when dry and lay them close, or to lay them dry and not quite so close together?

SOME EXHIBITS AT THE CHICAGO CEMENT SHOW

A Description of a Few Displays—An Idea of the Appearance of the Interior of the Coliseum

AMONG the many exhibits at the Sixth Annual Cement Show recently held in the Coliseum in the city of Chicago, there were a number of special interest to readers of this journal, and in what follows will be found a brief description of some displays which are entitled to more than passing notice in this connection. The half tone engraving upon this page affords the reader a very good idea of the appearance of the interior of the Coliseum after the exhibits had been installed. It will be seen that the place was attractively decorated and the exhibits placed with an idea to more or less uniformity and a ready accessibility to the throngs of visitors daily in attendance.

Many of the exhibits showed the results obtained

was conspicuous with a large display comprising an "Oshkosh" portable pump, two "Oshkosh" mixers, and an "Oshkosh Eveready" saw rig. The "Oshkosh" portable pumps are particularly designed for general contractors, and are made in a number of sizes and designs, and can be driven by steam or gasoline engines or electric motors. The pump on view had a capacity of pumping 3600 gallons of water per hour at a low cost of 25c. per day. The "Oshkosh" mixers are noted for simplicity of construction and durability. They are built in many sizes and in mixing they accomplish a maximum speed with a minimum number of mixing projections.

The "Oshkosh Eveready" saw rig is furnished with



General View in the Chicago Coliseum, Showing Scheme of Arrangement of the Exhibits

by the investigation of electric currents on concrete. One display showed a beam of concrete to which was attached an apparatus so sensitive as to record a displacement of one-millionth of an inch. The beam was 7 x 7 in. in cross section and 39 in. in length.

One exhibit of particular interest showed the various stages in the chemical analysis of a concrete sample. Another set of containers showed the clinker obtained from burning the various classes of rock. The entire exhibit was a most interesting one, especially from an educational standpoint.

The Oshkosh Manufacturing Co., Oshkosh, Wis.,

a four-cycle type gasoline engine, and is inexpensive in operation. E. C. Leach, general manager, was in charge, assisted by W. A. Lewis, Wisconsin sales agent, and A. M. Anderson, Illinois sales agent.

Various types of "Majestic" coal-chutes were the chief exhibits of the Majestic Furnace and Foundry Co., Huntingdon, Ind., of which the Nos. 10 and 20 were in prominence. The booth was in charge of M. H. Burk and J. M. Triggs.

Another feature of the Cement Show was the display of an extensive variety of concrete mixers. A mixer noted for its practicability and durability, known

as the "Low Down" force feed concrete mixer, was shown by the Elite Manufacturing Co., Ashland, Ohio. One of the notable points of this machine is the feeding device. The material is not fed by means of buckets, but is forced into the mixing trough in an even, continuous stream, which guarantees a finished concrete of even texture. The many advantages of this product

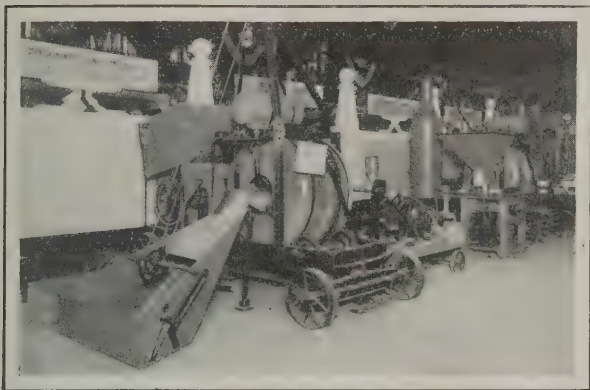


Exhibit of the Oshkosh Mfg. Co. at the Chicago Cement Show

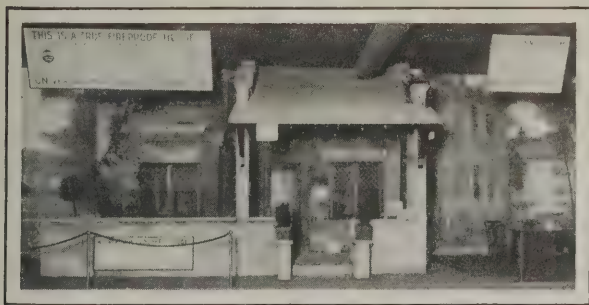
were consistently explained by Mr. P. E. Countryman, manager of the exhibit. This display is shown in the lower left-hand corner of the large picture upon the previous page.

The American Saw Mill Machinery Co., Hackettstown, N. J., demonstrated an "American" portable variety wood-worker, the exhibit being in charge of E. J. Johnson, Chicago Manager.

The improvements on this machine make it invaluable to the up-to-date contractor. With 3 h.p., its capacity in 1¼ in. lumber is 75 to 125 lineal feet per minute; 2 in. lumber 30 to 60 ft., and 3 in. and even heavier lumber can be easily ripped. This wood-worker is a combination of four machines, for sawing, planing, jointing and boring can be done in one operation by four different people.

The possibilities of building a double wall in one operation by the use of Van Guilder double 4 in. concrete walls was ably explained by A. Van Guilder of the Van Guilder Hollow Wall Co., Rochester, N. Y. In front of the exhibit was to be seen a wall, several feet in height, constructed under the Van Guilder method. The remaining space in the booth was consumed with the display of wall building combinations of distinctive types and improvements.

A popular group of exhibits throughout the exposition were those of the Universal Portland Cement Co.,



Front View of the Display of the Universal Portland Cement Co.

Chicago and Pittsburgh. A fireproof cement house was one of their main attractions. It was constructed entirely of cement, except the glass in the windows and the wooden frames to carry the glass. It was built in two days by George H. Fox & Co., Chicago contractors. The foundations, walls and partitions were of concrete

hollow tile, the floors of concrete tile and reinforced concrete construction. The porch floor was surfaced with red cement tiles and the roof covered with cement asbestos shingles, which made the dwelling in every respect a fireproof building. Another display was devoted to the advantages of taking care of sacks. C. S. Fletcher of the Universal stated that his company "mended 3,000,000 during the past year.

Illustrated lectures were given at specific intervals throughout the day. Subjects such as the manufacture of concrete, uses of concrete on the farm, concrete roads, etc., were discussed in detail. Moving pictures created additional interest.

Rudolph J. Wig and Samuel E. Young of Washington, D. C., were official representatives of the National Bureau of Standards, whose display was the largest in the Coliseum.

Chicago "A.A." Portland cement was used exclusively in the installation of the booth of the Chicago Portland Cement Co., Chicago, Ill. The table, lawn seat, sun dial, flower urn, pedestal and lighting standards were all of concrete manufacture.

The system of construction followed, known as the "Trusswall" system, is unique, inasmuch as the concrete is not poured, but is turned, the lathe and the metal templates superseding the form or mold heretofore used in work of this character.

A collapsible core is used in the work of construction. This core is first placed in the lathe, fully pro-



General View of the Booth of the Chicago Portland Cement Co.

tected with paper to prevent the concrete adhering to it. An even coat of concrete is then applied and allowed to partially set. The reinforcing is next placed. This consists of wire, or wire and rods, of a suitable gauge, thickness and quantity to carry the desired load. The wire is wound from end to end of the shaft, at an angle of about 45 degrees, by revolving the shaft, thus forming a diamond mesh which covers the column.

When additional reinforcement is necessary, rods are placed lengthways, from end to end of the shaft, and these are again covered with a second layer of wire in the manner already described. The final coat of concrete is then applied, turned, and permitted to set, after which the core is withdrawn from the finished column.

Under this system, which has gained wide recognition among architects, a column may be produced in concrete of any size, to any detail, thoroughly waterproof, and not unduly heavy as it is hollow, symmetrically correct and without mark or blemish.

Fastening Screws in Brick Walls

A simple way to fasten screws in tile or brick walls is to drill holes, not too large, for the screws, then tear up some paper, wet it and make a pulp. Pack this pulp tightly in the hole and turn in the screws.

New Publications

The New Building Estimator.—By William Arthur; 748 pages. Size 5 x 7 in., pocketbook form. Profusely illustrated. Bound in flexible leather covers with gilt side title. Published by David Williams Company, 239 West Thirty-ninth street, New York City. Price, \$3 net.

This, as its name indicates, is a handbook for the architect, the builder, the contractor, the superintendent of building construction, the draftsman, the engineer and the appraiser. It is a practical guide to estimating the cost of labor and materials in building construction from the excavation to the finish of the structure. It is the eleventh edition and has been revised and greatly enlarged. In fact there is fully 50 per cent. of new matter added, and included are many new illustrations. The work is comprised in 47 chapters and all after Chapter 30 and beginning with reinforced concrete work, are made up of new material.

It is well known that the success or failure of a builder to show a margin of profit upon a contract depends upon his ability to accurately prepare the figures of cost and any literature which will assist in facilitating the preparation of an estimate cannot fail to interest a very large class of readers. In the book under review the subject of estimating is treated in a comprehensive style and covers the field in a way which has probably never before been attempted. Not only is the cost of a building estimated from beginning to end, but there are numerous practical examples of work presented in detail and with labor figured chiefly in hours and quantities.

In the words of the author the book is chiefly designed for estimating and need not be examined for much else. An estimator needs a book of his own. When one considers the variety of buildings ranging from the three-room cottage to the five and ten-story fireproof structure, to say nothing of more lofty ones, and that a general contractor is obliged to possess a fair acquaintance with each branch, there seems to be quite enough in this field to engage the attention of any one man. "How much will it cost?" is an important question that has to be decided before the final word is given to go ahead, and herein lies the responsibility of the estimator who must do his work carefully enough to keep his employer out of bankruptcy—sometimes an owner is swamped with a heavy bill of extras.

Among the additions which have been made to the present edition there are detailed figures on reinforced concrete and many chapters on square, cubic foot and comparative costs; on silos; depreciation, physical valuation, approximate cost of wood trusses, short cuts, equipment of buildings, wage tables, ornamental iron work, etc., which serve alike for architects, contractors, insurance and other appraisers and railroad engineers. The book is one which no architect, builder or contractor can afford to be without as it will be found a most valuable addition to his library of practical trade literature bearing upon the subject indicated by the title.

Fire Prevention Value of Metal Roof

An interesting incident which might be used with advantage by sheet metal contractors to induce their customers to use either a good tin roof or metal tile roof instead of the cheaper so-called fireproof roofs was related in a recent issue of the *Brooklyn Daily Eagle*. This incident had to do with the facts surrounding the burning of Somers' Hall in that borough on or about that date.

In its account of the fire the *Eagle* states that the

metal tile roof saved the adjoining tenements from burning. Somers' Hall stood about 100 ft. along Rockaway avenue, and about 115 ft. along Somers street, and was a two-story brick building with a Spanish metal tile roof. The roof formed a perfect hood and prevented the flames and smoke from coming in view of the hundreds of persons watching the place burn. This roof also hampered the firemen, but at the same time was probably the means of saving some three-story frame tenements that adjoined the burned building. Three firemen were injured by the falling of the roof when it could no longer withstand the intense heat.

Further facts about this incident may be had from the Meurer Bros. Co., Brooklyn, N. Y., which company furnished the Spanish metal tiles with which Somers' Hall was roofed.

Oak Flooring vs. Carpets.

By W. L. CLAFFEY

In recent years the hardwood floor, especially oak flooring, is rapidly taking the place of carpets which are the champion collectors of dust and germs. The ordinary home builder is often misled in regard to prices of oak flooring, which is cheaper than carpets. A yard of carpet is 27 in. wide by 3 ft. in length and contains 6¾ sq. ft. Carpet sells at from \$2.00 to \$9.00 per yard and a fair average, for a good quality, would be about \$3.00 per yard. Clear quartered (best grade) oak flooring ¾ in. thick by 1½ in. or 2 in. face can be bought, laid and polished for \$1.00 per carpet yard, with the price based in Cincinnati. This is about one-third the price of good carpet.

The ¾-in. thickness is used very extensively to cover old pine floors in old homes. All one needs to do is to rip off the quarter round trim, level off the sub-floor and lay the ¾-in. oak flooring at right angles to the old floor. New bungalows and all classes of homes and apartment buildings are using ¾-in. thickness with marked success.

When one enters a home where oak flooring is used their attention is immediately attracted by its handsome appearance. Its color is rich and cheerful and gives that dignified tone that is desired.

Builders and architects recognize oak flooring as among America's best flooring. It attracts a better class of tenants and makes a vast difference in the renting and selling value. A striking example of this can be seen daily in our newspapers in the advertising section where homes are listed for sale or for rent. Oak flooring, if used, is always emphasized.

The pattern makers' trade course as pursued at the Williamson Free School of Mechanical Trades, Williamson School P. O., Delaware County, Pa., is outlined at some length in Bulletin No. 12, just issued by the institution in question. The matter is arranged in such a way as to be of benefit to all interested in trade instruction, more especially those who are engaged in establishing and managing trade schools. The course covers a period of three years, and in connection therewith are shop talks, giving information relative to the names, care and use of tools, together with explanations of trade details; also talks relative to pattern makers' machinery, as well as on technical de-

The seventh annual meeting of the Canadian National Association of Builders Exchanges was held February 18 to 20, in the Builders Exchange rooms in Calgary.

WHAT BUILDERS ARE DOING

Bird's-Eye View of Building Situation in Leading Cities—Estimated Value of the Projected Improvements

THE statistics for January as compiled by Inspector Clarence E. Stubbs, show building operations in the city of Baltimore, Md., as very satisfactory. Expenditures authorized are materially ahead of the same

period in 1912 and should the present rate be continued would result in a record-breaking building year. Authorized expenditures included 208 two-story brick dwellings, \$320,350; 12 two-story frame dwellings, \$43,700; 5 manufacturing and



warehouse builders, \$21,000; one school, \$53,852; one garage, \$5,000, and one moving picture hall, \$23,500.

Total authorized expenditures are summarized as follows: New improvements, \$665,402; alterations and additions, \$115,000; 20 per cent. for allowance for under-valuation amounting to \$156,080, bringing the actual expenditures for construction work to a total of \$936,482.

Buffalo, N. Y.

Bureau of Building statistics for January, 1913, show a total valuation of \$478,000 for the 204 permits issued during the month. This is a slight gain over the corresponding month of the previous year, in which 196 permits were issued with a valuation of \$427,000. The unusually mild weather prevailing during the larger portion of the month of January permitted rapid progress to be made on construction of buildings under way, and was taken advantage of also by contractors to start work on many building projects which ordinarily would have been deferred until spring.

Among the most important buildings covered by the January permits are the following: Office, laboratory and factory building for the Foster-Milburn Company to cost \$108,000, from plans of Architects Colson & Hudson, for which the Eastern Concrete Steel Company has the general contract; a theater building 80x120 ft., 46 ft. in height, fireproof, to be erected by L. Michaels at Allen street and Elmwood avenue, to cost \$50,000; a 3-story club house for the Order of the Orioles at Genesee and Jefferson streets, to cost \$75,000; a church and school building, 3 stories and basement, for the St. Monaca's Church, from plans of Architects Lansing, Bley & Lansing, to cost \$40,000; a settlement house for the Jewish Federation of Buffalo, for which general contract is held by the Eastern Concrete Steel Company, \$42,000; underground comfort station, shelter house and tunnel, Shelton Square and Main street, for the City of Buffalo, \$40,000; valve house, 80x300 ft., at the new water works pumping station, foot of Porter avenue; enlarging and remodeling the City Hospital for contagious diseases, \$25,000; alterations and additions to the Charity Organization building, Franklin street, \$20,000; Association Hall for the Mt. Carmel R. C. Church, \$20,000; foundry building, 106x402 ft., 1 story and gallery, for the Otis Elevator Company, from plans of Architects Green & Wicks; large addition to the "Bond Plant" of the American Radiator Co., Rano street, \$45,000; and extensive additions to the plants of the Barcalo Mfg. Co. and the Buffalo-Pitts Company.

Plans are in preparation for a 17-story office building to be erected on the site of the old Law Exchange building at Niagara and Eagle streets. Plans are also under way for the addition of 2 stories to the Masonic Temple on Niagara street.

Canton, Ohio

The first annual banquet held by the members of the Canton Builders Exchange occurred on the evening of February 5, when covers were laid for considerably more than 100 guests, among which was a delegation of 20 from

the Builders Exchange at Alliance, Ohio. The office of toastmaster was very acceptably filled by J. P. Williams. After the menu had been given proper consideration James M. Carter, secretary of the Builders Association Exchange of Buffalo, made a very interesting address on "The Value of Organization." The remarks of the speaker were followed with close attention on the part of his hearers and before concluding he made it plain to the non-members present that there was a certain value in organization that could not well be overlooked.

Following Mr. Carter, Secretary Charles R. Kumpf, of the Canton Builders Exchange, gave a "review" and "preview" of that organization. He told of what it had accomplished in the past year and also what it expected to do in the future through corporation with other civic bodies. He placed emphasis on the fact that the Builders Exchange was always in favor of a larger and better Canton, and that it would work with and not against other civic bodies in civic improvements.

The next speaker was R. H. Evans, a general contractor of Columbus, Ohio, who, among other things, spoke on "Compulsory Compensation," and said that it was time for the builders to send a delegation to Columbus in order to lower the builders' cost of this insurance.

Chicago, Ill.

That there are good grounds for the optimism prevailing in Chicago building circles is, in a measure, substantiated by comparing the aggregate values of permits issued for January with the same month of 1912. In January last year 422 permits were issued for buildings having 8,808 ft. frontage and costing \$1,999,300, while in January this year 515 permits were issued for buildings occupying 17,333 ft. frontage and costing \$7,041,600.

The figures for this year are swelled by the permit for the Cook County Hospital, to cost about \$3,000,000. In spite of this, however, the clemency of the weather contributes largely to the present prosperous conditions. Building has progressed unceasingly throughout the winter months, and contractors are presented with unusual opportunities considering the time of the year.

The erection of the Continental Bank building, the 4½ million dollar structure, and the Conway building, both under the supervision of the Thompson-Starrett Co., received a set-back when the men went on strike early in January and did not return to work until February.

One of the first efforts of Chicago business interests to conform to the building ideas promulgated by the Chicago Plan Commission will be expressed in a million dollar structure to be erected on the river front by Reid, Murdoch & Co., wholesale grocers. The site chosen is bounded by N. Water St., the Chicago River, La Salle St. and N. Clark St. The building will be a modern fire-proof structure, ten stories in height, which will have a frontage of 322 ft. facing the river, and will extend 150 ft. on N. Water St., 191 ft. on La Salle St., and 41 ft. on N. Clark St. The construction is to be of re-enforced concrete, and will be graced on the top with a triangular tower with a clock face on each side. George C. Nimmons is the architect. Operations have already commenced and the building is expected to be ready for occupancy by January, 1914.

The predominance of business district improvements continues to be the chief topic in local circles. One of the latest features is the erection of a new hotel to be built in the place of the present Morrison Hotel, now located on the corner of Madison and Clark Sts. It will be built in three sections, and when completed will cost \$2,500,000. The dimensions will be 200 ft. x 67 ft., and the height 19 stories. Marshall and Fox, the architects, are planning to place this structure in the front rank of first class hotels throughout the country.

A sixteen-story office building is to be erected on the northeast corner of La Salle and Van Buren Sts., a "loop" district location. It will cost \$750,000, and will be in a sense an addition to the 12-story Webster build-

ing, a structure which has recently been completed. Permission has been granted to the Board of Education to erect a three-story brick school to be located at 7029-37 Rhodes Ave. The cost will be \$150,000.

A one-story brick factory 195 ft. x 275 ft. will be shortly erected by the Chicago Metal Bearing Co., at cost about \$150,000.

The Lakeside Hospital Association announces the completion of plans for its new 6-story hospital to be located at Thirty-ninth St. and Vernon Ave. It will cost \$150,000.

Holabird & Roche, architects of this city, are completing plans for a 12-story hotel to be erected in Omaha, the cost of which will be \$1,000,000.

A buffet luncheon and smoker was tendered the members of the Chicago Builders and Traders Exchange when attending the annual meeting held in the Chamber of Commerce on January 20. Throughout the day there were over 300 members in attendance. Officers elected for the ensuing year are:

President—John D. Corlett.

First Vice-President—Thos. B. Roy.

Second Vice-President—A. C. Jaeger.

Treasurer—Jos. E. Lindquist.

Secretary—J. H. Hendricks.

The members are to be congratulated in retaining John D. Corlett as president for 1913, and with an aggressive Board of Directors the interests of the association may be expected to advance materially.

The election of officers for the ensuing year of the Builders Club of Chicago took place on January 11, returns being as follows:

President—Harry C. Knisely.

First Vice-President—Louis W. Crow.

Second Vice-President—James A. Green.

Treasurer—Joseph E. Lindquist.

The Board of Managers consists of Lewis D. Binyon, James H. Clark, Joseph Hock, Edward Middleton and John W. Snyder.

Cincinnati, Ohio

The month of January, 1913, is so far ahead of the corresponding month of 1912, that some explanation is required. During January of this year 847 permits were taken out, having a total valuation of \$946,962, while the same month last year only had a record of 321 permits, valued at \$195,075. In a way this wide difference can be attributed to the open weather this year, as against contrary conditions existing last year. There was also one permit taken out in January, 1913, for a 12-story office building that increased the average above normal.

The December report of the Building Commissioner gave only \$257,250 for estimated improvements, but the bulk of this was for residence construction.

The Cellular Steel Company, Cincinnati, is a new incorporation with \$100,000 capital stock, organized to take over the plant and business of the Cellular Metal Company, in Carthage suburb. E. W. Edwards, president, the Edwards Mfg. Company, is president of the new company, and G. Myers, secretary. The company will make a specialty of fireproofing material.

Cleveland, Ohio

Building operations in this city during 1913 started out with a record breaking month as regards new permits. During January 515 permits were issued for new buildings to cost \$704,740. During the corresponding month a year ago there were 185 permits issued for new buildings, the estimated cost of which was \$328,107. The open weather that has prevailed during much of the winter has permitted outside work to go along with little interruption and it is probable that weather conditions are to some extent responsible for the remarkable showing made during the month. The new permits were for all classes of rather small construction work and did not include any large buildings. The building outlook for the year continues exceedingly promising. The erection of several large buildings in the downtown business section of the city is under consideration and it is expected that during the early summer considerable important work will come out.

Columbus, Ohio

The Builders and Traders Exchange has just gotten out in attractive shape a brief review of the activities of the organization during the year 1912. The matter is made up of lists of officers, directors, standing committees, special committees, etc., together with the address of President E. K. Hibbs; a short account of the various entertainments and smokers during the year, a few statistics and items of interest culled from the records, and finally some of the problems on which the Exchange has been working for the benefit of the membership and the public at large. On the last page is the brief announcement that

J. B. Coulter, organizer of the Columbus Builders and Traders Exchange, died 1912.

Los Angeles, Cal.

Whether the local building trades will share the loss suffered last month by the citrus fruit industry of southern California remains to be seen. The loss was severe, and will doubtless have far-reaching effects, but this particular industry is now only an incidental factor in the growth of this city. Building operations have been slightly curtailed for the last month, the volume of new work being smaller than for the corresponding period of the two previous years, but the decrease is too small to cause any discouragement.

The record for January was \$2,078,736, compared with \$2,270,680 for December, and \$2,456,872 for January, 1912. The number of permits was 1390, the largest on record for January, compared with 1912 a year ago. A material gain is noted in dwelling construction, for which 579 permits were issued, with a valuation of \$1,095,836. Large single jobs were notably lacking, the most important item being an \$85,000 loft building, but contracts are now coming out for several large Class A structures.

Louisville, Ky.

At a meeting of the board of directors of the Builders Exchange, held February 6, at 400 Realty Building, the following were added to the Board: Emile B. Bourlier, H. J. Hach, C. E. Card, C. C. Childers and Samuel Warren.

The board then organized by electing the following officers to serve for one year:

President, A. J. Anderson.

First Vice-President, L. W. Hancock.

Second Vice-President, Gus Albrecht, Jr.

Treasurer, Alfred Struck.

Secretary, J. M. Vollmer.

Nashville, Tenn.

The members of the Builders Exchange held their fifth annual banquet in January when covers were laid for 110. James A. Daugherty was toastmaster and the members gave him a great surprise by presenting him with a beautiful token of esteem in the shape of an imported bronze table light. Another pleasurable feature of the evening was the presentation to President R. T. Creighton of a beautiful candelabra as a mark of appreciation for his services during the past five years as president of the organization.

One of the most important results of the banquet was the invitation extended to the Nashville Real Estate Exchange to join the builders at the next quarterly informal dinner to be held at noon on February 21. The invitation grew out of a brief talk by J. W. Patrick, in which he called attention to the need of the builders and the real estate men acting together and urging some understanding relative to the operations of the two classes of business men and advocating a concession on the part of the real estate men in the taking of building contracts. Mr. Patrick was followed by Secretary Winter, who stated that he was sure the members of the Builders Exchange were always willing to do the square thing and he suggested that a joint banquet of builders and real estate men be held with a view to bringing about a better understanding between the men engaged in the two different lines of business.

The report of Secretary Thomas H. Evans of the Nashville Builders Exchange, which has recently been issued, shows the work of the organization for the year 1912. From it we glean the fact that the membership of the organization on the 1st of January of the current year was 101. There were 59 sets of plans for residences, schoolhouses, office buildings, warehouses, garages, etc., handled by the Exchange, the buildings approximating a cost of \$851,347. About 87 per cent. of this work was executed by members of the Exchange.

Reference was made to the work of the Entertainment Committee during the year, to the series of quarterly dinners which were held and to the "outing" in June, at which something over 300 members and their friends participated.

The annual banquet held at the Exchange rooms January 7, at which 125 were present, was a most enjoyable affair. On Christmas Eve Secretary Evans was made the recipient of a very handsome umbrella. In concluding his report Secretary Evans expressed his sincere thanks to the directors and members for their hearty co-operation.

New York City

Notwithstanding the open winter and the resulting very favorable weather for conducting outside building opera-

tions there was less work planned in January in Greater New York, as a whole, than was the case in the corresponding month of last year. This does not apply, however, to Brooklyn and the Borough of Queens, where there was an increase over January a year ago. In the Borough of Manhattan there were, according to the report of Superintendent R. P. Miller, 39 new buildings planned in January estimated to cost \$3,900,450, while in the same month of 1912 there were 72 new buildings planned, estimated to cost \$6,252,175.

This sharp falling off was due to lessened activity in several classes of building construction. For example, there were only seven tenement houses planned last month, costing \$810,000, against 21 planned in January last year, estimated to cost \$1,555,000. There was also a falling off in the planning of store and loft buildings, a type of structure which has been very popular lately. Last month 7 were planned to cost \$818,000, while in January, 1912, plans were filed for 9 of such buildings, costing \$1,526,000. In the matter of office buildings, 3 were planned in January in each of the two years, but the cost of those projected last month was \$600,000 and those a year ago \$935,000. Of public buildings, places of amusement, etc., two were planned last month to cost \$91,000 as against 8 in January a year ago to cost \$1,305,000.

There were 237 plans for alterations filed last month to cost \$840,336, and in January last year there were 243 plans filed for alterations costing \$695,075.

In Brooklyn there was an appreciable increase in the value of the buildings planned last month as compared with the year previous, the figures issued by Superintendent P. J. Carlin showing plans having been filed in January of the current year covering 278 new buildings costing \$2,898,870, to which must be added \$314,221 for alterations to old buildings. In January last year permits were taken out for 240 new buildings costing \$1,814,795, and in addition alterations costing \$243,152.

The favorable weather for operations was reflected in the amount of work projected in the Borough of Queens in January as contrasted with a year ago. Here there were 321 buildings planned, involving an estimated outlay of \$1,021,176, while in January last year 222 buildings were planned, to cost \$884,740. The increase is due to the number of frame dwellings and brick tenements being erected, and the record is all the more remarkable from the fact that this year neither office buildings nor hospitals were planned against six of the former, costing \$114,600, and one of the latter, costing \$87,000, which appeared in the records a year ago.

Philadelphia, Pa.

Open weather during January augmented building in this vicinity to a considerable extent. Outdoor operations were permissible almost throughout the entire month, and a number of operations planned for early spring were begun. Statistics compiled by the Bureau of Building Inspection show that 673 permits were issued, covering 791 operations at an estimated cost of \$1,566,740, showing a material gain over the same period last year, when 448 permits, embracing 593 operations, were issued at an estimated cost of \$1,265,020. Under the classification of two-story dwelling houses an expenditure of \$353,100 was authorized as compared to that of \$345,300 during January, 1912. In dwellings of the three-story type the gain in favor of the past month was \$57,300. It is interesting to note that no permits were issued in January for tenement or apartment houses. Permits for the erection of manufacturing buildings, workshops, engine and boiler houses involved an approximate expenditure of \$285,000. Garages contributed \$118,550 to the total, while an expenditure of \$63,000 for municipal buildings was authorized.

Builders look forward to a more active building year in 1913. Dwelling house operations are expected to show an increase in some sections of the city which have heretofore been, to a certain extent, undeveloped. Considerable schoolhouse work is in prospect, as well as office and general manufacturing buildings.

E. Allen Wilson, architect, is planning several large dwelling house operations on which work will be started early in the spring. One for 132 dwellings, 16x51 ft., is to be built by Thomas J. Ward in the vicinity of Ninth street and Hunting Park avenue, which will cost \$225,000.

Another operation planned by the same architect is for 43 houses. They will be two stories, 15x43 ft., and are to be erected by Armstrong & Wiley, owners, on Medary avenue west of Twentieth street. Sub bids on this work are now going in.

The Board of Education, Camden, N. J., is taking bids for a three-story school house, 131x153 ft., to be erected at Twenty-ninth and Muckle streets, in that city. Clyde S. Adams, Philadelphia, is the architect. The building is

estimated to cost \$100,000. Electric lights and steam heat (fan system) are to be installed.

F. Webber, architect, Morris building, has plans in preparation for a 15-story apartment house, 70x100 ft., of steel and terra cotta, to be erected at Nineteenth and Rittenhouse streets. Owner's name is withheld.

Local builders are estimating on a two-story brick and stone school building, 120x140 ft., to be erected in Mt. Carmel, Pa., for the Borough School District, from plans by Clyde S. Adams. The building will be lighted by electricity, while the heating and plumbing has been reserved.

Zantzing, Borie and Medary, architects, have invited approximate estimates on plans for the proposed 37-story office building to be erected at Broad and Locust streets. Plans call for a building 82x117 ft., extending for 25 stories, the remaining 12 stories to be of tower-like construction.

The Master Builders Exchange elected at its January meeting the following directors to fill the usual three-year term: D. O. Boorse, G. J. Watson, W. N. Mayhew, J. Turley Allen, Jacob L. Tyson, James L. Quigley and W. S. Lilley. Wm. R. Dougherty was elected to fill an unexpired term of one year.

The annual election of the officers of the Exchange was held at the regular February meeting of the Board of Directors on February 11, resulting as follows:

President—Joseph M. Steele.

First Vice-President—William R. Dougherty.

Second Vice-President—George J. Watson.

Third Vice-President—J. L. Tyson.

Treasurer—Frank H. Reeves.

Secretary—Charles E. Smith.

Trustee—C. J. Leiper.

Portland, Ore.

Local building contractors are greatly encouraged by the amount of new work that has come out in the last month, and particularly by the prospect of further improvement during the spring. The aggregate valuation of buildings for which permits were issued in January was \$1,126,570, compared with \$712,110 for December, and \$901,272 for January, 1912. The valuation was the best since last August, and the highest on record for this time of year, when operations are usually hampered by the weather. Aside from the large business blocks planned, a notable feature of the work in prospect is the number of first class residences, several of which will reach a value of \$25,000 to \$40,000.

Plans are being figured for a large number of store, office and apartment buildings to cost up to \$50,000. The largest single structure for which plans have been completed is the Ford Motor building, to be of steel and concrete, 3 stories high, and to cost about \$250,000.

The desire to erect tall buildings has induced the City Council to authorize the mayor to appoint a committee for the revision of the Building Code, and one change will doubtless be the removal of the 12-story limit.

Providence, R. I.

The thirty-fifth annual meeting of the Builders and Traders Exchange of this city was held on the afternoon of January 13 at the headquarters of the organization, 75 Westminster street, when reports of various officials were presented showing that the past year from a business point of view had been one of gratifying success. George D. Lansing, the retiring president, briefly reviewed the work of the year, noting some of the most important achievements of the Exchange and pointing out that an increase in growth was contemplated which would necessitate larger quarters. His report as a whole was of a very optimistic nature.

The report of the secretary showed that 16 new members had been added during the past year, making the present membership 112. The election of officers resulted as follows:

President.....Theodore H. Perry.

Vice-president.....Frederick L. Pierce.

Treasurer.....M. J. Houlihan.

Secretary.....George S. Ross.

In the evening the thirty-fifth annual banquet was held at the Blackstone Hotel, President Perry acting as master of ceremonies. He took occasion to thank the members for the great honor conferred upon him and expressed the hope that the organization might continue to grow in strength and prosperity. Various kinds of souvenirs were distributed to the members during the evening and the program, which began with a stein song and ended with "Auld Lang Syne," provided a jolly good time. The chairman of the committee of arrangements was M. C. Bennett, to whom much credit was due for the excellent manner in which the program had been carried out.

Sacramento, Cal.

The building situation is rather remarkable for this time of year, the amount of new work undertaken in January being greater than for any month since December, 1911, and setting a new high record for the month. The valuation of buildings for which permits were issued during January was \$415,398, compared with \$350,315 for December, and \$94,577 for the corresponding period of last year.

As for some time past, dwellings constitute the most important item, but some good sized industrial buildings are contemplated or under construction, the largest being in connection with the fruit business. The largest single permit issued last month was for the \$180,000 cannery of Libby, McNeill & Libby at 31st and R streets. The building will be of brick, with concrete floors.

Wells, Fargo & Co. announce plans for a 2-story fireproof building, 60 by 200 ft., to cost about \$100,000. H. E. Yardley and others are having plans drawn for a 6-story apartment house, to cost about \$175,000.

San Diego, Cal.

Building activities have so far continued on about the same scale as for the greater part of last year, new work being hardly as plentiful as in December, but far more so than a year ago. The record is, in fact, surprisingly high for January, being \$830,127, compared with \$528,252 for the same month of 1912, and \$219,450 in 1911. The total for December was \$970,830.

The principal buildings for which contracts were let last month were: The Coronado school, to the Wuester Construction Company, at \$64,800, exclusive of plumbing, heating, etc.; the \$50,000 Bridges residence, of frame, tile and plaster construction, on Point Loma, the contract going to C. E. Edwards; and a large 4-story building for the Owl Drug Company to Duval & Sons, Oakland, Cal.

San Francisco, Cal.

The year has started off in good shape and new contracts have been coming out rapidly, including a number of fairly important jobs. The total valuation of building permits for January was \$2,062,001, the best month's total since last July. The gain over December is nearly

\$1,000,000, while the record for January last year was \$1,870,617.

All lines of building material are extremely strong, both local and suburban demand having been unusual for this time of year. The first full cargo of lumber for the Exposition has just arrived from Gray's Harbor. There is no actual scarcity of lumber, but owing to weather conditions the northern mills are rather slow in filling orders. The surplus of brick left from last year is being reduced by shipments north and to Hawaii, etc. Most of the cement mills are again running full, with a good demand, and preparations are being made to increase the supply of lime during the spring. Some difficulty is still experienced in getting structural and reinforcing steel as early as is desired, but wholesalers have put in liberal supplies of other steel products and building hardware in general, and are able to fill orders in nearly all lines.

One of the most interesting jobs will be the removal of the Commercial High School to a distance of about a quarter of a mile from its present site, the contract for which will probably go to the Sound Construction Company, at \$151,000. The route traversed will be mainly over city property, and only one small concrete building will have to be torn down. The school building is of brick and steel, 120 by 142 ft. in area, three stories high, and weighs approximately 13,600,000 lbs. According to Grant Fee, who erected the building four years ago at a cost of \$263,000, it rests upon 65 steel piers.

One of the largest buildings for which contracts have recently been let is the steel and concrete warehouse of the Ford Motor Company, general contract let to the Clinton Fireproofing Company at \$161,000. Segregated contracts amounting to about \$150,000 have been let for the 10-story Liebes-Meyer building at Sutter and Market streets, and Macdonald & Kahn have the contract for a 4-story reinforced concrete apartment house at Eddy and Fillmore streets, at \$155,000.

Building in outside towns is again attracting attention. One of the largest structures is the 10-story Fresno Estate building, Fresno, Cal., for which the Lindgren Company, this city, has taken the contract at about \$300,000. Bids will be received Feb. 18 for a new city hall at Santa Rosa, Cal., and plans are under way for a \$250,000 stone hotel in Yosemite Valley.

BUILDERS' APPLIANCES AND EQUIPMENT

Some Things of Seasonable Interest to Those Having
to Do with the Building Business

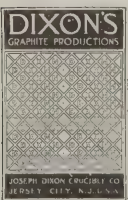
Catalogue of Joseph Dixon Crucible Company

We have just received a copy of what is the largest and most complete production catalogue ever issued by the Joseph Dixon Crucible Company, Jersey City, N. J., and which has just been mailed to the thousands of manufacturers, jobbers, purchasing agents and others interested in graphite, paint, lubricants, crucibles, pencils and the other productions of the company. Although the catalogue consists of more than 100 pages of text and illustrations it does not by any means carry a full description of the entire Dixon line and only a few of the many hundreds of

Dixon American Graphite Pencils are listed.

We understand that the company attaches a peculiar value to this catalogue inasmuch as it serves to acquaint those who are already users of one form of graphite with its many other forms and uses. In the accompanying illustration is a representation of the cover design. If any reader of *The Building Age* is particularly interested in graphite products he can secure a copy of this catalogue by addressing the company as above.

In this connection it may not be without interest to state that Joseph Dixon, who was the founder of the Joseph Dixon Crucible Company, began the business in 1827, and that was the beginning of the graphite industry. The statement is made that the Dixon Company is the largest and best known concern of the kind in the world under whose roofs all the various graphite products are manufactured.



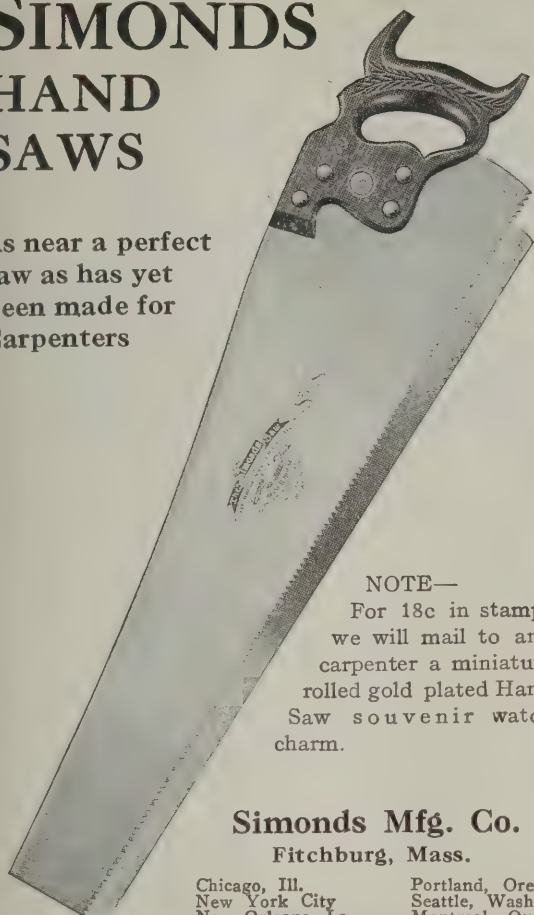
The Modern Dairy Barn

Barn architecture and equipment are fast becoming specialized fields and there are architects who make a business of drawing barn plans and specifying barn construction. The up-to-date manufacturer of such barn equipment as steel stalls, carriers, stanchions, haying tools, etc., has also come to regard his business as one not simply of manufacturing and selling merchandise regardless of its ultimate destination, but one of planning, selecting and installing the particular equipment best suited to the requirements of the individual barn or stable. This is the business of the J. E. Porter Company, Ottawa, Ill., which was established by Mr. Porter in 1868. The concern goes so far as to maintain a Consultation Department under the direction of experts in barn architecture and equipment, and their services are offered to farmers, dairymen, contractors and builders. The goods made by the company cover both stable equipment and haying tools, including in their range stalls, stanchions, mangers, partitions, calf and bull pens, litter, feed, milk and hay carriers, steel tracks and barn door hangers, hay forks, etc.

In a handsomely illustrated catalogue sent out by the company to contractors, farmers and others interested in goods of the character indicated, each of the main Porter lines is described and there are also illustrations of the various tools and pieces of equipment manufactured by this concern. The catalogue also contains valuable information concerning the construction and arrangement of dairy and hay barns. Those of our readers who are interested in barn equipment of the character indicated can secure copy of the catalogue in question by making appli-

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4th Ave. & 13th St. NEW YORK, SINCE 1848.

cation to the company. We also understand that the contractor who so desires can discuss large jobs with the company's department of architectural consultation.

Better Buildings

In the second edition of a very attractive booklet entitled "Better Buildings" just sent out by the American Sheet and Tin Plate Company, Frick Building, Pittsburgh, Pa., the recipient will find much valuable data on the sub-

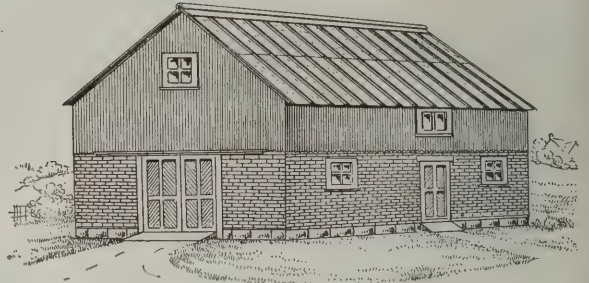


Fig. 1—General View of Barn Covered with V-Crimped Roofing and Corrugated Siding

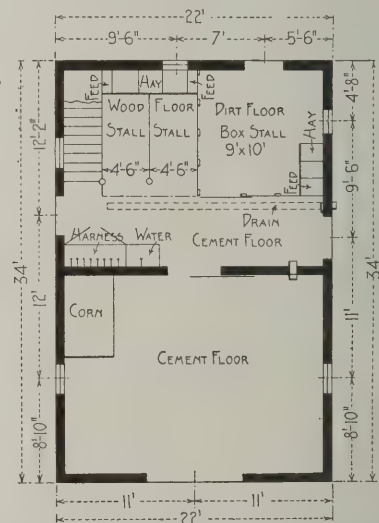


Fig. 2—Plan of Barn Shown in the Picture Above

ject of corrugated and formed sheets for roofing together with directions for measurement, methods of application, etc., etc. That portion of the booklet which will be found of most direct interest to many readers of this journal is that which is devoted to views of barns, churches, bungalows, residences, factories and metal buildings which are roofed with corrugated sheets. In connection with many of the designs are plans and sectional views, the matter being arranged in such a way as to appeal to the prospective builder. We reproduce in Figs. 1 and 2 the general view and plan of a barn covered with V-crimped roofing and corrugated and plain brick siding. Illustrations are also presented showing the application of Cambridge Ridge Reversible Metal Lath for interior and exterior uses. Tables of standard weights per square of formed products and other information of value to roofers are given. The little work has proven extremely popular among builders, farmers and others and any reader interested can secure a copy on application.

Modern Wood Finishing

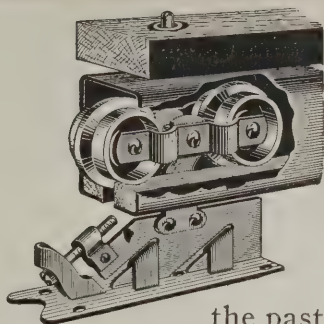
The Bridgeport Wood Finishing Company, New Milford, Conn., and with New York office at 55 Fulton street, has issued a handsome *brochure* setting forth the merits of Bridgeport standard wood finishes and illustrating by means of a number of interiors harmoniously treated in colors the results accomplished by the use of the wood finishes in question. The interiors represent the principal rooms of a modern dwelling and the color effects are most pleasing and harmonious.

Several pages are given up to liberal sized panels showing the artistic and practical effects which may be produced by the use of Bridgeport standard wood finishes. One page is given up to illustrations of Mission finishes which are obtainable with the company's penetrating stain and waxed finish. The claim is made that these do not raise the grain of the wood, neither do they lap nor set too quickly and when rubbed off show a smooth finish. The descriptive text goes into the matter of modern floor

(Continued on page 48)



"Every
Hanger
a Car."



Discriminating Architects, Contractors and Builders Demand Richards- Wilcox Door Hangers

For they know that the high standard of perfection we have maintained for the past 30 years is an assurance of honest value.

They know, too, that Richards-Wilcox Hangers embody many improved features unknown to ordinary hangers. Such as forged steel yokes, case hardened bearings and center hung trucks that cause heavy sliding doors to glide easily and noiselessly over the clincher type hard maple tracks. Both hanger and track can, if desired, be removed **after** plastering without injuring or disturbing the walls.

"High-Priced?" No, Sir! The first cost is no greater than that of an ordinary hanger. In the long run they cost far less, for Richards-Wilcox Hangers are **made** to stand the wear and tear of heavy sliding doors—require no tinkering or repairing, you see.

Why specify or install Hangers of unknown or doubtful merit that are more than likely to cause no end of trouble and dissatisfaction? Why not give the people for whom you plan or build the **one** door hanger that meets all requirements and insures perfect operating sliding door—the R-W?

They're sold and recommended by dealers all over the world. Write for special architects catalog No. 10—It lists "A Hanger for any door that slides." So you are sure to find one that suits.

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MANUFACTURING CO.
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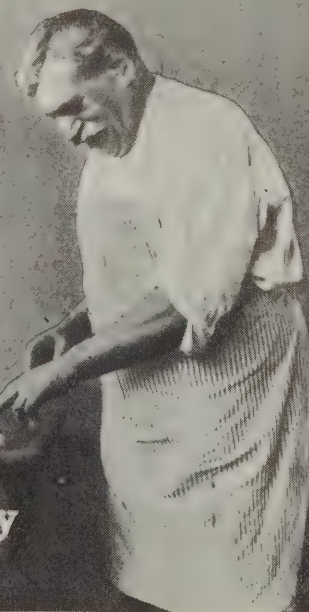
Perhaps some of my fellow-workers would prefer the **Oblong Carborundum Combination Bench Stone** to the round.—The difference is only in the shape.—Like every other Carborundum Stone they cut quick and clean—give your tools that keen, smooth, edge—an edge that stands up. Every Carborundum Stone is uniform throughout—it has no soft spots—won't get slick—and it *will* cut.

You'll find the combination stones mighty handy—one side is coarse grit, for bringing the tool to an edge—the other side fine and smooth—to give the tool a keen finished edge—really two good stones in one. You can always rely upon Carborundum Stones.—I know, because I use them.—I find them a tool-kit need—a work-bench necessity;

YOUR HARDWARE DEALER HAS THEM

Carborundum Combination Stone No. 108 (oblong), ...	\$1.25
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PETE SAYS—



The Carborundum Company

Niagara Falls, N. Y.



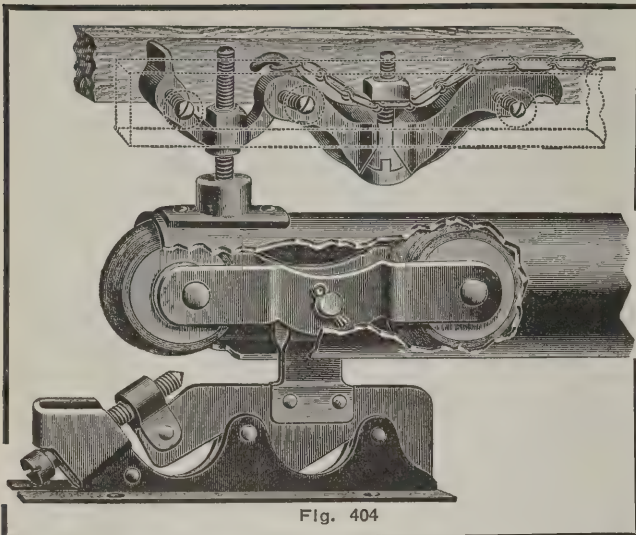


Fig. 404

Perfectly Hung Doors

Depend Entirely on the Hangers

Cannon Ball Hangers insure *permanent* satisfaction. Both hanger and track easily adjustable with an ordinary screwdriver, and both are instantly accessible from the center of the door opening, allowing either end of track to be raised or lowered as desired.

The Cannon Ball House Door Hanger

Specially formed wheels with roller bearings—wide tread—leather covered. Frictionless, noiseless, practically indestructible. Steel hanger and plate for attaching to door.

Track of 14 gauge steel $2\frac{1}{4}$ -inch inside diameter, slotted $\frac{1}{4}$ inch on under side.

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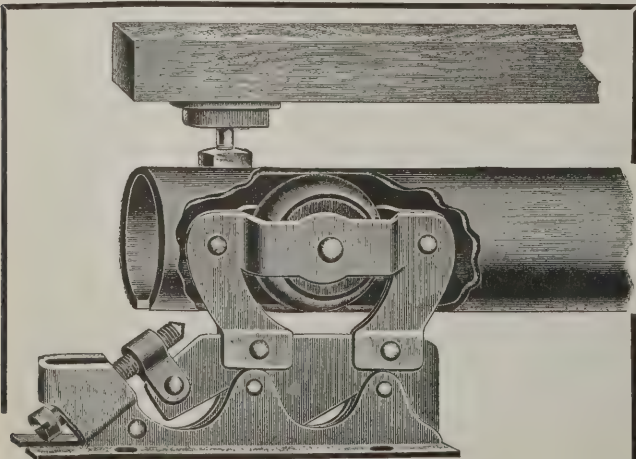


Fig. 468

62

finishing and varnishes as well as the method of obtaining stained effects of wood. Comments are presented on Wheeler's Paste Wood filler and there are suggestions for the architect, the builder, the painter and the decorator. The book contains reproductions of 48 different wood finishes in natural colors and tells how to obtain any effect desired. While the price of the book is 25 cents, we understand the company will be glad to send a copy free of charge to any reader of *The Building Age* who may make application for it.

Griswold's Adjustable Roofing Bracket

An adjustable roofing bracket which carpenters and builders are likely to find of advantage when shingling a roof is illustrated in Fig. 3 of the engravings. The bracket fastens on three courses of shingles and is locked to two shingles on the roof so that it cannot be accidentally removed. The bracket is made of steel, is light in weight

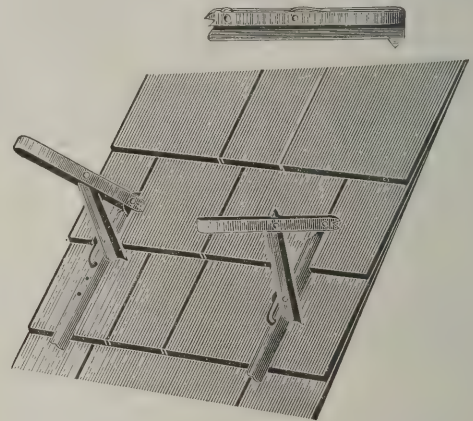


Fig. 3—Griswold's Adjustable Roofing Bracket

and folds into small space for packing. The illustration shows two brackets in place upon a roof, but each being at a different angle from the other for the purpose of indicating the variations permissible. The small view at the top of the picture shows the appearance of the bracket when folded. The bracket is made by W. S. Griswold, 37 John Street, Springfield, Mass., who points out that it is of great convenience when working around dormer windows, skylights and on piazza roofs as the bracket can be adjusted to any pitch of roof in an instant and gives a staging 14 in. wide on which to work if desired. In using the bracket it is only necessary to take it in its folded position, slide it between two shingles to a distance of $2\frac{1}{2}$ to 3 in., then raise the loop portion to the angle necessary to suit the pitch of roof; fasten the hook in one of the holes and it is ready for use.

Catalogue of Columbia Sander

"Columbia Sander No. 2" is the title of a very artistic and comprehensive book just issued by the American Wood Working Machinery Company, Rochester, N. Y., illustrating and describing the company's latest product in the way of a triple drum sander. Every one who is interested in a machine of this character is entitled to a copy of this book upon request to the company.

Mechanics' Tools

It is a well-known fact in the trade that good mechanics are proud of their tools and take great care in keeping them in proper shape with keen cutting edges. They fully appreciate the fact that they can do better and faster work when the tools are in proper condition, but at the same time in order to do good work they must possess good tools. Of what use is a chisel that will not hold its edge or a saw that requires sharpening after slight usage? They are naturally cheaper as regards first cost, but the mechanic will soon become dissatisfied and throw them out. Had he purchased the best tools he would probably have paid a few cents more and would have had the pleasure and satisfaction of owning something of value and which would be appreciated more and more with the progress of time. Hammacher, Schlemmer & Co., Fourth avenue and Thirteenth street, New York City—one of the largest tool houses in the country—has specialized for 65 years on high grade tools. Under one roof they have the best tools the market affords—Disston saws, Russell Jennings bits, Hammond hammers and hatchets, Stanley planes, Buck Bros. chisels and many others of similar character, all makes bearing a reputation for quality. Tools of this kind will stand all legitimate tests; will en-

(Continued on page 50)

Our Barn Plan Service is Yours

— for the Asking —

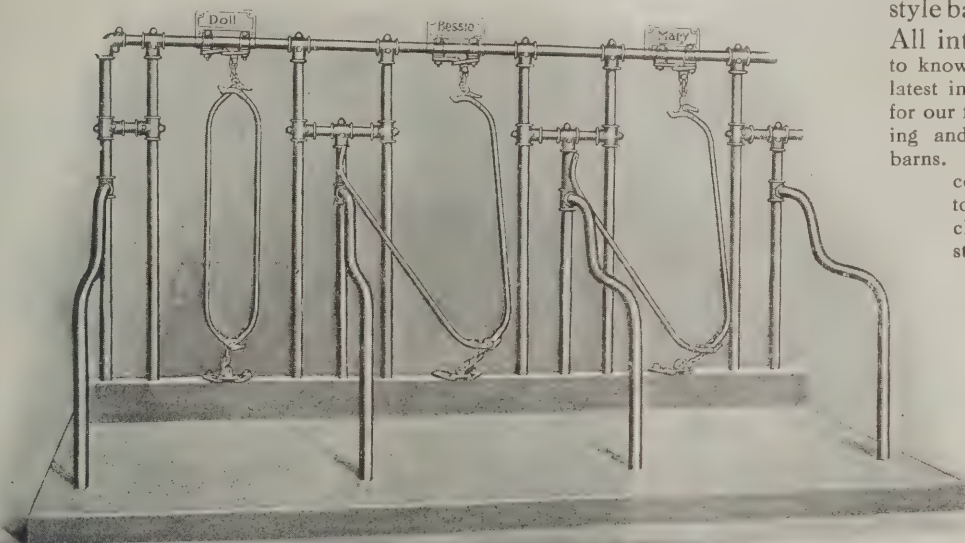
New dairy barns are being built in every state in the Union, and it is important for carpenters and contractors to post themselves in regard to the requirements necessary to properly equip these barns, as the farmer and dairyman

are not satisfied with old style barns and methods.

All interested who wish to know about the best and latest improved, should write for our free book on the building and equipping of dairy barns. We make a full and complete line of hay tools and fixtures including steel stalls, cow stanchions, feed and litter carriers, barn door hangers, hay carriers, forks, pulleys, hay slings, etc.

New illustrated catalogue will be mailed free.

J. E. Porter Company
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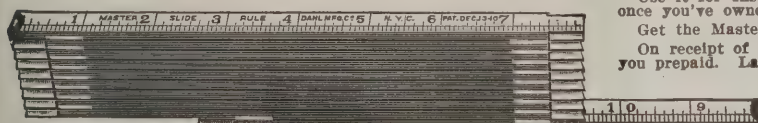


The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

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You can't get along without the Master Slide Rule and have perfect convenience and perfect work. Think of a moderately priced pocket rule that extends six feet, with all the accuracy of a caliper!

Use it for Inside Measurement or otherwise—you'll find it indispensable once you've owned one.

Get the Master Slide Rule at your dealer's. If he hasn't it, write us. On receipt of 15c per lineal foot, a 4, 5 or 6 foot rule will be sent to you prepaid. Large profits to agents. Write for circulars and particulars.

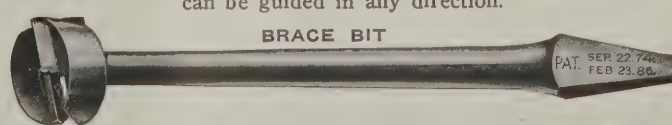
**DAHL MFG. CO., 417 Fifth Ave.
New York City**



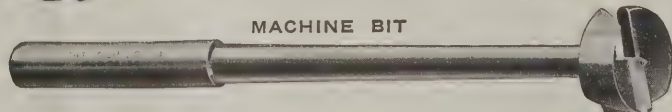
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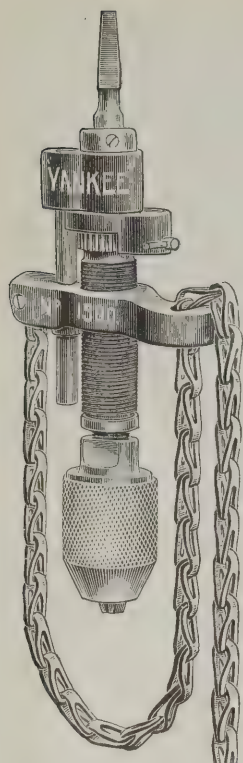
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FRICTION FEED

Adjusts itself automatically to the size Drill Point used, and feeds no faster than it can take. This saves Drill Points. The slack in the chain is quickly taken up by the automatic friction movement, and this is reversed for slackening the chain or taking the Drill from the work, giving you the quickest operating and biggest time-saving Chain Drill made. There is no hand feed to fool with, and nothing to catch and pinch the fingers. Like all other "Yankees" it is built as substantially as is possible to make it throughout.

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with 3-Jaw Chuck
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Let us send you—FREE the "YANKEE"
Tool Book—tells all about them.

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All sizes and designs

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Buck Brothers' Tools are LASTING tools—they keep their edge.

We make a full line which includes bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.

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For Floors in Stores, Churches, Depots, Kitchens, Halls,
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Sanitary Floors are required. Also for Fireplaces.

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sure for a lifetime, and give the mechanic entire satisfaction when it comes to using them in his work. The concern issues an abridged catalogue of tools containing 200 pages, showing among other things a complete line of carpenters' tools which cannot fail to prove of interest to every good mechanic. This catalogue is known as No. 3101 and a copy of it can be had by any reader of *The Building Age* by making application to the address above given.

Adaptability of Metal Spanish Tile

That Metal Spanish Tile is meeting with widespread interest is shown by the many different types of buildings on which it has been installed. It came after years of study and experiment with a view of perfecting weather-proof tile roofing combining architectural beauty, light weight, ease of application, fire and lightning proof qualities and low maintenance cost. The Berger Manufacturing Company, Canton, Ohio, has presented the building world with a product for which the need has long existed.

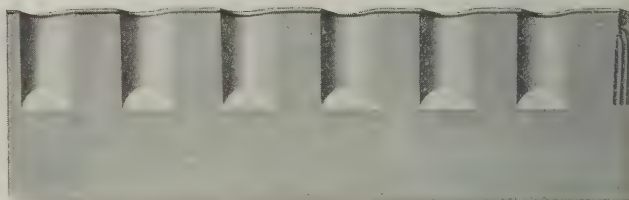
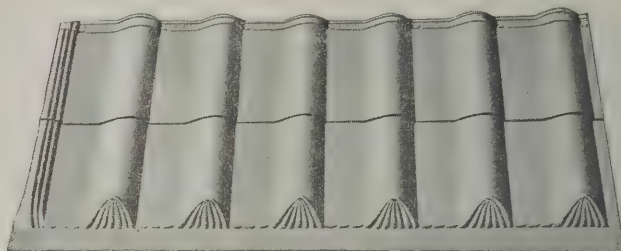


Fig. 4—Showing Two Styles of Metal Spanish Tile as Made by the Berger Mfg. Co.

It offers a handsome, durable roof at a moderate cost and is adaptable to residences, stations, express offices, as well as all kinds of public buildings, and in the case of every installation up to the present time it has met with the approval of all concerned. In the tile brought out by the Berger Mfg. Company, Canton, Ohio, two forms of which are shown in Fig. 4 there are many features of construction which are worthy of note. The water guard of the tile is high and the joints are perfect with ample provision for expansion and contraction under all climatic conditions. The heavily embossed S-shapes permit free circulation of air underneath the Metal Tile Roofing, keeping the underside of the tile roofing and the roof sheathing free from moisture.

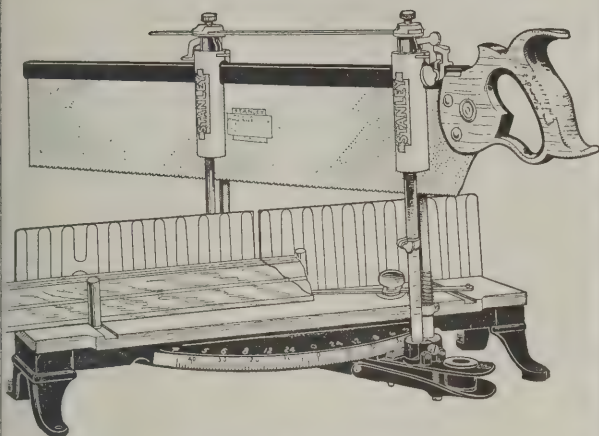
This air space also acts as a non-conductor of heat and cold. That Metal Spanish Tile Roofing has come to stay is indicated by the many installations for which it is being specified.

Rock-Ore and Gravel Handling Machinery

Under the above title the T. L. Smith Company, 1327 Majestic Building, Milwaukee, Wis., has issued a very attractive catalogue of 40 pages in which the merits of the lines of machinery indicated are clearly set forth. Doubtless there are many users of crushing machinery who are not altogether familiar with the new form of gyratory crusher having the main shaft stationary and who cannot therefore fail to be interested in the information which is to be found within the covers of this little work. The descriptive text is illustrated by means of numerous half-tone engravings made directly from photographs of the machines and parts thereof, thus carrying a faithful representation of the exact appearance of the finished goods. Among the distinctive features of the Symons Crusher, which differs radically from its predecessors in many ways, mention may be made of the fact that the central shaft is stationary and is not gyrated as in machines of the lever shaft type; the eccentric is inside the head, extending the full length of the shaft from bottom spider to crown; the eccentric acts on the head and not on the shaft; the head is not rotated and does not act as a grinder, and finally the Symons has only two main bearings—the inner and outer surfaces of the eccentric. In connection with the text are numerous tables which will be found of value, testimonial letters and special reference to rotary screens, elevators, friction hoists, adjusting mechanism, dust collars, portable outfits, etc.

(Continued on page 52)

Stanley Tools



Stanley Mitre Boxes

STRONG—DURABLE—ACCURATE

A Few Striking Features

Saw is held above work when not in use.

Swivel is automatically locked at any angle.

Two sockets in swivel for use of long or short saw.

Narrow opening in back of frame, especially adapted for small work.

Steel rod uprights for saw guides.

Uprights adjustable for saws of varying thicknesses and for those that run out of true.

Stock guides for holding work in place.

Extra wide range of work—will saw at angle of 30 degrees.

One-Piece frame with detachable Malleable iron legs.

Construction thoroughly mechanical; all parts interchangeable and readily replaced if lost.

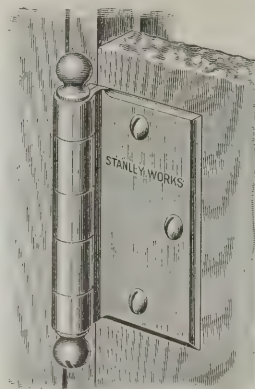
Quickly and easily put together or taken apart for carrying.

A specially made Back Saw furnished with each box.

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Stanley's Ornamental Surface Butts No. 165

Save Time and Labor and Please the Owner

The Ornamental leaf screws on the surface of the door, saving half the time of mortising. The slotted ball tip can be unscrewed and the pin reversed so that the butt can be used on either right or left hand doors.

The handsome, dignified Beveled Edge design harmonizes with the popular designs of builders' hardware. The butts are made in all finishes.

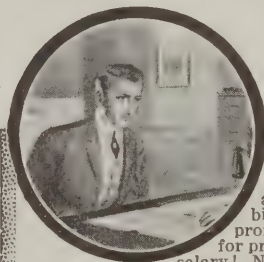
Write for booklet E describing this and many other lines of "Stanley" Quality Hardware.



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The **WOODLIFE**
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ately packed. To be mixed as needed. Widely used by architects and builders for shingled houses, bungalows and all rough wood. Write for particulars.

Chas. H. Brown Paint Co.
Brooklyn, N. Y.

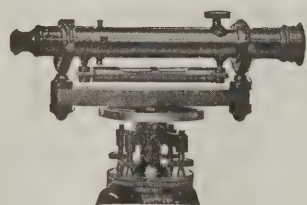
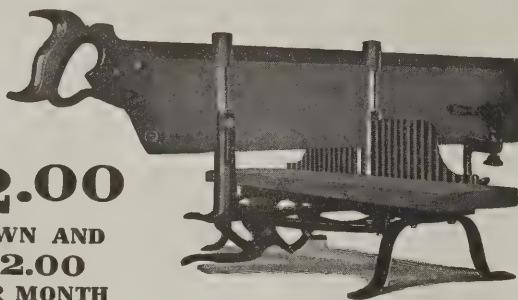
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This is our easy payment plan. This Box formerly sold for \$12.50. Now, \$8.95 cash—or \$10.00 on payments. Fitted with 28x5 or 30x5 saw of the very best make. Send for catalogue.

We sell direct to carpenters, giving you the benefit of the middle man's profits.

CROWN TOOL MFG. CO., Ottumwa, Iowa



Time is Money

**Save Time
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WHITE'S IMPROVED LEVEL

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Our Levels are Guaranteed.*

**DAVID WHITE CO., 418 E. Water St., Dept. B
Milwaukee, Wis.**

Pearson's Automatic Shingle Nailer

Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. Throw nails in by the handful—holds about 600 nails—start nailing.

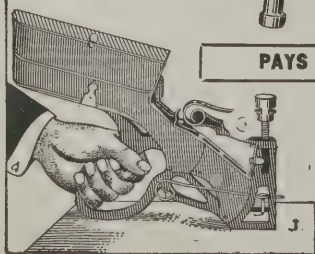


Nails can be driven through tin or quite heavy sheet iron.
Made in two sizes:
The BLUE Nailer for 3d common No. 14 gauge wire nails.

PAYS ITS COST ON ONE JOB

The RED Nailer for 3d galvanized No. 13 gauge 1 1/4-inch wire nails.
Order through your dealer or sent prepaid for \$5.00.

Money refunded if not as represented
PEARSON MFG. CO.
Robbinsdale, Minn.



New Plant for Manufacturer of Fireproofing Materials

Financial interests back of the Edwards Mfg. Company, 423-443 Eggleston avenue, Cincinnati, Ohio, have purchased the plant of the Cellular Metal Company at St. Bernard, a suburb of Cincinnati, who will operate it under the name of the Cellular Steel Company with a capitalization of about \$100,000. The head of the new concern is E. W. Edwards, president of the Edwards Mfg. Company, and G. D. Meyers, its secretary, who will hold the same position in the new corporation. Other officers of the Edwards Mfg. Company will also be interested in the St. Bernard plant. At the start the company will continue to make the regular fireproofing material which has heretofore been turned out and which has the approval of the Underwriters' Association of the United States. In addition to the making of cellular metal, which is a factor in the fireproofing of buildings, the new corporation will make a specialty of a fireproof partition, also known as a "Key ridge," which has been tested by the Mechanical Department of the University of Michigan and claimed to be the best fireproof material of the kind to be introduced. The frame with plaster on both sides is said to take up less than 2 in. of space and to resist heat in a most satisfactory manner. Orders have been placed for special machinery and as soon as this is in place employment will be given to 200 men.

Tools Necessary for Slate Roofing

One very durable form of roof covering at the present day for buildings of various kinds and especially churches, schoolhouses and dwellings, is slate, and the question often arises as to the tools which are required for properly laying roofing slate. Many of our readers will therefore be interested in the following descriptive matter and accompanying illustrations, for the latter of which we are indebted to the Auld & Conger Company, 1200 Prospect Street, Cleveland, Ohio. The hammer is the tool most used and in every way the most necessary. It combines four tools in one—a hammer for driving and a claw



The Hammer



The Stake



The Ripper

Fig. 5—Tools Necessary for Slate Roofing

for pulling nails; a knife for cutting and a point for punching the slate. The stake is the next tool in importance and is used for sticking into the roof sheathing or scaffold plank for a rest on which to punch and cut the slate. It is also used as a straight edge to mark the slate when cutting and fitting around chimneys, dormers, hips and valleys. The ripper comes next and is used to take out broken slate when repairing. While a slate machine is not an absolute necessity no roofer can well be without one, as it will do the work of many men and much better than by hand. It is adjustable to any size or shape; cuts and punches at the same operation; countersinks the hole, cuts round or straight and does not spoil the slate. Another great advantage in using a machine is that it punches slate to gauge which for iron or lath framed roofs is indispensable. A slater usually carries a pair of tinner's snips to cut metal flashings, a 2 ft. rule, a nail pouch and a chalk line. All of these slaters' tools are made and sold by the company whose address is given above.

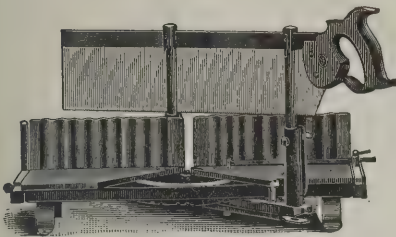
C. E. Jennings & Co. have just taken possession of the entire first loft in the new building at 71 Murray street, New York City, giving 5,000 sq. ft. of floor space. One of the features of the company's new quarters is to be the sampling of various lines of mechanics' tools for working wood and metals made at the different factories of the company which has not heretofore been possible in an entirely satisfactory way because of the lack of adequate floor space.

The Oak Flooring Bureau, 895 Hammond Building, Detroit, Mich., is distributing with its compliments a celluloid rule marked off in multiples of inches and bearing the inscription, "Specify Oak Flooring."

(Continued on page 54)

Goodell Mitre Box

Made of STEEL—Cannot Break
First in Quality and Improvements

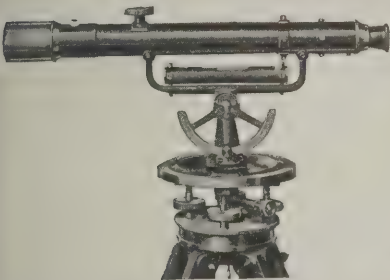


Automatic Stops for holding up saw.
Corrugated Backs Graduated.
Gauge for Duplicate cuts and many other features.
If you want the best you will take no other.
Send for Circular K.

GOODELL MFG. Co., Greenfield, Mass.

The Yankee (A Compound Level)

Just the thing for the Arch.-Builder
An accurate level for moderate cost



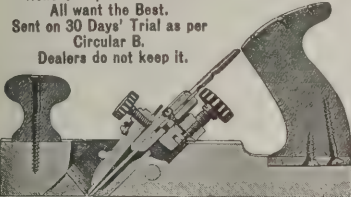
Runs Horizontal and Vertical Angles.
Sold guaranteed by Frost-Adams Co.
37 Cornhill, Boston, Mass.
Write for latest catalogues.

INTRODUCTORY TRIAL OFFER

If the SELF-SETTING PLANES are not sold in your town and you write us saying "I saw your trial offer in Building Age," we will send you particulars, a carpenter's pencil and our \$1.00

THE BEST IS THE CHEAPEST

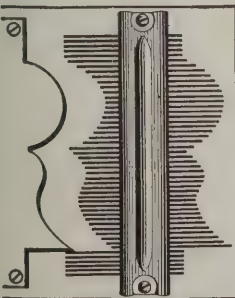
None Cheap but the Best.
All want the Best.
Sent on 30 Days' Trial as per Circular B.
Dealers do not keep it.



O. K. ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained, eaty, knurley, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT. If it is not worth to YOU, OR YOUR MEN, TWICE ITS COST, return it at our expense as above stated. If you send us the addresses of ten carpenters, no matter where they live, we will send you another hard, tough carpenter's pencil. Give the SELF-SETTING PLANE a chance to PROVE ITS WORTH. If it FAILS, return it and we will return your money. GAGE TOOL CO., Vineland, N. J.

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A New Tool



especially designed to reproduce irregular surfaces or curves, as required by pattern and cabinet makers, architects, builders and carpenters.

By simply pressing the rods in the gauge the exact profile of the object is obtained.

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2-inch ...30c. 5-inch ...75c.
3 " ...45c. 6 " ...90c.
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Prices on application.

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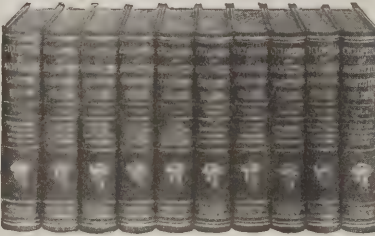
H.V. von Holst

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This big, new Plan Book, Modern American Homes, containing hundreds of valuable suggestions, besides 108 plates with complete plans for every style of house, from the medium priced cottage to the most palatial suburban and city residence; also a large variety of apartment buildings, libraries, churches and institutional buildings, tent houses, garages, boat houses—the best in modern architecture by the greatest American Architects. This book of plans is 9 1/2 x 13 in., printed on special paper and substantially bound.

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This work covers everything in the building professions, from the first rough sketch of the architect to the acceptance of the finished structure. It includes wood, stone, steel, and reinforced concrete construction; estimating and contracting; a study of the Greek and Roman Orders; interior finishing and decorating; and modern house lighting and sanitation.

Partial Table of Contents

Mechanical, Freehand, Perspective and Architectural Drawing, Lettering, Pen and Ink Rendering, The Orders, Superintendence, Strength of Materials, Masonry, Reinforced Concrete, Carpentry, Steel Square, Stair-Building, Hardware, Steel Construction, Roof Trusses, Practical Problems, Estimating, Contracts, Specifications, Building Law, Sanitation, Sheet Metal Work, Electric Wiring and Lighting.

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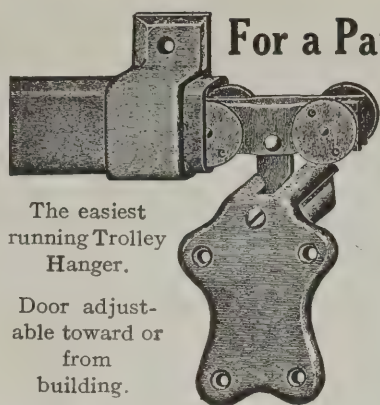
With every order for a Cyclopaedia we will include the Plan Book, absolutely free of charge and send you the Cyclopaedia and the Plan Book, express prepaid, for seven days' free examination. You keep the books a full week—examine them thoroughly at your leisure—and if they don't meet with your expectations they may be returned at our expense. Remember—the complete set, Cyclopaedia and Plan Book, are sent free upon receipt of the coupon below and we pay express charges both ways if they are not satisfactory.

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Please send Free Plan Book, also Cyclopaedia of Architecture, Carpentry and Building for seven days' examination. I will send \$2.00 within seven days and \$2.00 a month until I have paid \$4.00 for Cyclopaedia (Plan Book included free), or notify you and hold books subject to your order. Title not to pass until fully paid. B. Age, 3-13
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For a Particular Job

Use the Best

**LANE'S BALL
BEARING
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HANGERS**

The easiest
running Trolley
Hanger.

Door adjust-
able toward or
from
building.

Lane Bros. Co., Livingston St., Poughkeepsie, N. Y.

TRADE NOTES

The General Roofing Mfg. Company, East St. Louis, Ill., manufacturer of "Certain-teed" roofing in rolls and shingles, has issued an interesting book entitled "Modern Building Ideas and Plans" which it will give absolutely without cost to any one requesting it of his dealer. It is a work that suggests many conveniences and economies, and shows illustrations of various types of buildings. It also tells the secret of how to have a satisfactory, durable roof and that is to use "Certain-teed" Roofing. On the back of every roll of this roofing and crate of shingles will be found the company's label of quality, which means that the purchaser is securing a sure roofing—one which has the quality certified and the durability guaranteed. The point is made that there is a kind of "Certain-teed" roofing that is particularly adapted for every type of building. It comes in red, green and slate gray shingles for bungalows, summer houses, garages, residences, etc., and is put up in rolls for general use. The claim is made that when laid in accordance with the "General's" specification it is rapidly replacing the old style coal tar and gravel roofing on big factories, warehouses, apartment buildings and skyscrapers. The company expresses a desire to present the reader with a copy of this \$1 book and states he can get a free copy at the place where he buys his building supplies.

The Tannewitz Works, 316 North Front street, Grand Rapids, Mich., direct attention to a very flattering offer which they are prepared to make to woodworkers generally. It is a machine embracing a band saw, an 8-in. jointer and planer; a saw bench, and a mortiser and borer. The frame is of cast iron and the manufacturers point out that this Universal woodworker "is the biggest value ever offered." The machine is furnished complete at the price including tools, belting and a heavy base with wheels, one of which swivels so that a man can move the machine easily. Any carpenter-contractor or woodworker who is interested in a machine of this kind can obtain illustrated literature relating to the proposition by sending to the address above given.

Bestwall Mfg. Company, First National Bank Building, Chicago, Ill., is sending out what at first glance purports to be a mourning envelope with heavy black border and upon the face is a view of a cemetery with a head stone in the foreground bearing the inscription, "In memory of Lath and Plaster." The folder within the assumed envelope calls attention to the merits of Bestwall—a substitute for lath and plaster and the product with which the walls of a building may be finished in mid-winter and the structure occupied at once.

The Combination Door Company, Fond du Lac, Wis., is distributing among the trade a folder illustrating and describing the combination storm and screen doors which it manufactures. The doors are made of kiln dried stock and glazed with "A" glass. The screens are mounted with galvanized wire cloth. The stiles and rails are mortised and tenoned. The stiles being 5 in. wide make the door very strong and prevent sagging. All doors are 1 7/8 in. thick and have full screen opening. The combination doors are made of soft Arkansas yellow pine and can be stained to match oak or any other wood desired.

"The Age of Your Building Depends on the Roof" is the subject of an announcement made by the F. C. Sheldon Slate Company, Granville, N. Y. It is pointed out that Sheldon's slates will insure a building against the ravages of time, decay and fire. These are furnished in red, green, purple and black and are pre-eminently artistic, economical and satisfactory. The company makes a specialty of color combinations to harmonize with architecture and surroundings and will send full particulars to any reader of the paper on request.

Grimm Mfg. Company, 37 Keystone Street, Buffalo, N. Y., points out that the combination woodworker which it is offering the trade is in reality nine machines in one. Reference is made to its simplicity of construction, efficiency in operation, and the quality of the work which can be turned out by means of it. There is embraced in the Grimm Combination Woodworker a rip saw, a cross-cut saw, dado head, molder, sander, jig saw, boring machine, jointer, saw gauge and miter device. The machine is equipped with gasoline engine, although it may be driven by electric motor if electricity is more conveniently available. A catalogue relating to the machine has been issued by the company and a copy of it will be sent to any reader who may make application.

The February issue of the "Lightning" Line, the monthly organ of the J. A. Fay & Egan Company, 221 to 241 West Front Street, Cincinnati, Ohio, contains the

(Continued on page 56)

Guaranteed as to Work and
Efficiency

Millers Falls Boring Machine

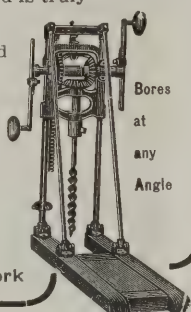
The Boring Crank is turned in one direction only whether boring or drawing auger out of hole. Fully Perfected. Bores at any desired angle and is truly

The Workman's Favorite.
Adjustable stop for
depth of hole and quick
reverse.

Adjustable
Cranks
Regulate Speed
and Power.

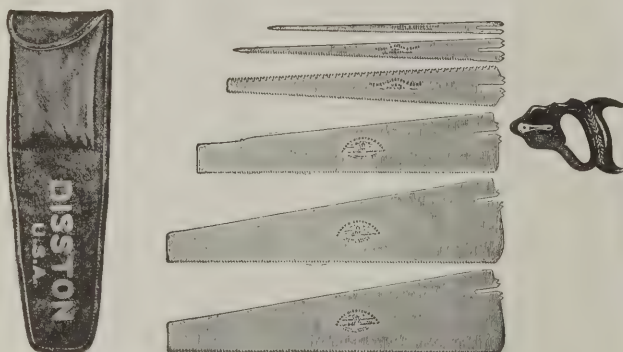
Boring Frame hangs itself up and is dropped to work by releasing thumb latch. Regularly supplied to bore 1 1/4 inches deep. Deeper if desired. Fully described in catalog, as are many other Millers Falls Efficiency Tools. Send for FREE copies of catalog and our book "Tool Practice."

MILLERS FALLS CO.,
28 Warren Street, New York



DISSTON Handy Saw Kit

No. 101, Six Blade Set



Contains an assortment of saws suitable for all regular and miscellaneous work. While the illustration only shows the No. 101, or Six Blade Set, the Handy Saw Kit is put up in five different sets, containing three, four, five and six blades.

The blades are made of Disston High Quality Crucible Steel, carefully ground and polished; the handle, of hardwood, carved and polished. The special formation of butt of blade prevents wobbling, and the operation of lever tightener enables an easy and quick attachment, or detachment.

Put up in a durable canvas case, having strong leather bound edges, and containing separate compartments for each blade, with a special pocket for the handle. Convenient and light to carry.

The combination of blades in any of these sets provides a Handy Kit for the practical carpenter, householder, farmer, etc. The Plumbers' saw blade is specially tempered for the cutting of wood in which nails may be embedded, lead pipe, and that class of work encountered in the ordinary course of plumbing. These are the finest and most practical Kits on the market.

At all Progressive Hardware Dealers

HENRY DISSTON & SONS
Incorporated

KEYSTONE SAW, TOOL, STEEL AND FILE WORKS
PHILADELPHIA, U. S. A.

The Age of Your Building Depends on the Roof

SHELDON'S SLATES, the natural rock product, will everlastingly insure your building against the ravages of time and decay and fire. Furnished in Red, Green, Purple, Black. Permanently artistic, economical, satisfactory. Artificial substitutes but a temporary expense. Our "Gt. Eastern" Green slates cost no more than wood shingles. If your building will support shingles it will support SLATE. Equally adaptable for old roofs. We make a specialty of color combinations to harmonize with architecture and surroundings. Full particulars on request.

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Granville, N. Y.

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Sea Green, Purple Vein, Genuine Bangor, All Grades

There will be a big demand in every locality in spring for Slate Roofing. Get in shape to handle the business Now. Write Today for our delivered prices on all grades of Slate, Slater's Tools and Supplies, and the Lightning Slate Dresser. Full instructions about laying furnished free to new men. We are the Oldest and Largest Roofing Slate Concern in the U. S. operating 3 large quarries at Poultney, Vt. and 1 at Bangor, Penna. Orders filled promptly with choice stock. References—any bank in Cleveland. DON'T DELAY—WRITE TODAY—NOW.

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Straight-Grained cedar that cuts like cheese; smooth, tough, leads that make clean-cut, strong marks—that's Dixon's Carpenter Pencil. Send 16c for sample lot. No. 32-J.
JOSEPH DIXON CRUCIBLE COMPANY
JERSEY CITY, N. J.



An Architect That Figured Right

Some men that receive from \$10 to \$15 a week for their services claim that they have no chance of advancement. They figure that they must have reached their limit. Thinking that they have solved their problem, they drop into a rut and stay there.

But such men do not figure correctly. This is clearly shown in the experience of Mr. J. Alfred Larralde, formerly of Hastings, Neb., but now at 1121 South Olive St., Los Angeles, Calif. Six years ago this young man's earning capacity was less than that of the average day laborer. He might have reasoned that he had reached his limit, but he didn't. He figured that the only way to earn more would be to learn more, and accordingly he enrolled for a Course in the International Correspondence Schools. Today as a result of the instruction received from the Schools, Mr. Larralde is a high-class architect specializing in the designing of bungalows, schools, and residences, earning more money in a day than he formerly earned in a week. And all because he figured his problem right.

If you are earning only \$10, \$12, or \$15 a week you are only at the threshold of your career. If you want information about the same instruction that Larralde received—if you want to know how your future can be made as bright as his—Mark and Mail the attached Coupon TODAY.

International Correspondence Schools

Box 969, SCRANTON, PA.

Please explain, without further obligation on my part, how I can qualify for a larger salary and advancement to the position, trade, or profession before which I have marked X.

Architect Arch'l Draftsman Contract'g & Build. Building Inspector Structural Eng. Structural Draftsman Plum. & Heat. Con. Supt. of Plumbing Foreman Steam Fit. Plumbing Inspector Heat. & Vent. Eng.	Estimating Clerk Civil Engineer Surveying Mining Engineering Mechanical Eng. Mechanical Drafts'n Stationary Eng. Electrical Engineer Electric Lighting Electric Railways Concrete Const'r'n	Automobile Runn'g Foreman Machinist Sh.-Met. Pat. Drafts. Textile Manufact'g Bookkeeper Stenographer Advertising Man Window Trimming Commerc'l Illustrat'g Civ. Service Exams. Chemist
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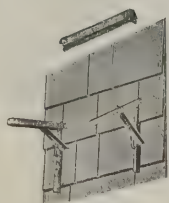
Name _____
St. and No. _____
City _____ State _____
Present Occupation _____

Parkhill's New Universal Pitch Gauge

marks more Roof-framing in less time than any other tool or method. More pitches—more framing for each pitch. All given by other tools, also both bevels on plancher, fascia, sheathing and purline; hip backing; octagon and irregular hips and jacks; hopper bevels, etc. Gauge and directions are so simple, easy and exact that even the most unskilled framers can mark all cuts, lengths, etc.—22 for any one pitch of 100 in 5 minutes. Other tools use over 1000 figures, the Universal has 15 only. Fits any square. Unexcelled as stair and brace gauge. Prepaid for \$1.50. Money back if returned. Agents wanted.

John Parkhill, Rochester, Minnesota

SEND \$3.50 for a DOZEN of these ADJUSTABLE ROOF BRACKETS

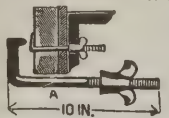


or \$10 for 3 dozen. Do not confuse with cheap makeshifts. These are Best and strongest Brackets on market. Made of steel, fold to small space as shown at top of cut, and are adjustable to roofs of any pitch. Time and labor saved in short time will pay for Brackets, which once obtained will last a lifetime. Your money back if on delivery Brackets are not satisfactory.

W. S. GRISWOLD, 37 John St., Springfield, Mass.

\$13.95 PER DOZ. (IF YOU SEND CASH WITH ORDER)

ABSOLUTELY SAFE, for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



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AND DUMB WAITERS
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Branch Offices. 136 Liberty St., N. Y. 108 11th St., Omaha, Neb.



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The Roofing without an Exposed Nail-head
Joints absolutely tight.



Practically
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Send for
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Entitled
"A TIGHT
ROOF."

ASPHALT READY ROOFING CO.
9 CHURCH STREET NEW YORK



USE Joist Hangers and Save on Labor Cost

Also save the full strength of your building material. Depend on the quality of steel in our hangers and on the gauge, width, etc. There is no crushing of timber on the seat of this hanger.

The width is always right and the shape fits flat everywhere. Your hardware dealer will order them for you, if you don't want to send your order to us direct (which might save you some time).

THE W. J. CLARK COMPANY
6th Street, SALEM, OHIO

usual quota of interesting matter pertaining to wood-working machinery. One illustrated article relates to the difference between band and circular sawing and the picture clearly illustrates the difference in the ways of the two kinds. Some of the machines to which reference is made are Fay & Egan spindle and disk sanders, band rip and resawing machine, and a little grinder which the company has recently brought out for grinding solid glue jointer heads. The claim is made that it will grind each bit exactly like all others, giving greater life to the heads, to say nothing of the better work a properly sharpened head will accomplish.

The Charles H. Brown Paint Company, Brooklyn, N. Y., is calling the attention of architects, builders, decorators and homeowners generally to "Woodlife" shingle stain, which is a deodorized creosote product said to have all the advantages of ordinary creosote without much of its objectionable odor. The claim is made that one gallon of "Woodlife" shingle liquid mixed with two pounds of "Woodlife" shingle stain color makes about 1 1/8 gallons of shingle stain ready for use. One gallon applied with a brush will cover about 100 ft. of surface with two coats or will cover about 400 shingles if dipped. In order to satisfy its customers as to the reliability of "Woodlife" shingle stain the company guarantees that it will wear well for at least five years on buildings to which it has been properly applied. Should it fail to do so the company will furnish new stain free of charge.

Leader Iron Works, Decatur, Ill., have extended an invitation to architects and all dealers in water supply goods to visit when convenient either their Chicago or New York City offices, where they can see Leader pumping equipment and tanks in operation. The concern carries in stock at Owego, N. Y., everything that is carried at Decatur, and all business east of the Ohio River is handled at Owego, the salesroom at 15 William street, New York City, being a branch of the Owego plant. This plant covers five acres of ground and during the past year switch tracks have been laid and a building containing about 12,000 sq. ft. of floor space has been erected for storage purposes. The statement is made that the Leader pumping equipment and tanks are meeting with a very gratifying reception and that the month of January showed the largest sales and the greatest number of shipments of any winter month since the company was organized.

Graphite for February, issued by the Joseph Dixon Crucible Company, Jersey City, N. J., in the interest of their graphite productions, contains much that is of value to those having occasion to use paints and lubricants. The illustrations relate to a gas holder in New Jersey, the boiler house of a coal company in Pennsylvania, and a general view of the new Otis elevator building in New York City. In the construction of the latter 1500 tons of structural steel were used and all protected with Dixon's silica-graphite paint. One very interesting picture is that of two packages of the company's Christmas boxes of pencils, which were the first parcel mail from Jersey City after the new parcel post law went into effect.

Crescent Machine Company, 206 Main street, Leetonia, Ohio, calls attention to the fact that its No. 51 Crescent machine is of such a nature that four men may work on it at one and the same time without interfering with each other. Each machine may be started and stopped independent of any other and each workman controls his work. The point is made that the No. 51 Crescent is not merely one machine that can do four different kinds of work but is a combination of five machines, four of which may be operated independently and at the same time.

Warren Profile Company, 85 Warren street, New York City, is the name under which the Reinhardt Profile Gauge, illustrated in these columns a short time since, will hereafter be manufactured.

The rural edition of "Concreting in Cold Weather," prepared especially for the farmer and for the small town contractor, has just been issued from the press by the Information Bureau of the Universal Portland Cement Company, 72 West Adams Street, Chicago, Ill. It outlines methods whereby concreting may be carried on throughout the winter months, making possible much new construction at a time when otherwise farm labor would be unproductive. It consists of 12 pages carrying numerous illustrations showing work in progress and completed. The book may be obtained free upon request to the company named.

Asphalt Ready Roofing Company, 9 Church Street, New York City, points out that its "Protection" brand of roofing has no exposed nail heads when laid and the joints are said to be absolutely tight. A booklet entitled "A Tight Roof" can be had by any reader for the asking.

❖ BUILDING AGE ❖



APRIL 1913 · PRICE 10 CENTS

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Surfaces waterproofed to prevent buckling!

Furnished in three finishes—plain oak, cream white and burnt leather. Requires no further decoration!

Battens to go with it—of same material!

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There isn't a town or city in the country without good possibilities if the business is gone after intelligently. Parquet floors represent the utmost in flooring of par excellence for the consumer. For the man selling them they constitute a permanent source of substantial profit—because the extent of the business is gauged only by the ambition put behind it.

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Flooring Factory
New Albany, Indiana

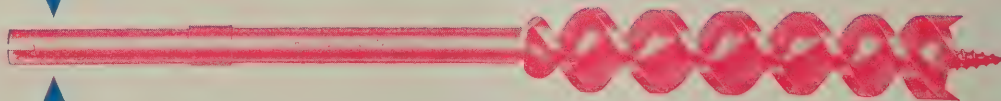


Sales Office and
Parquetry Factory
Rochester, New York

That Turned Shank

adds another reason why every good
carpenter should have a set of

RUSSELL JENNINGS BITS



The long, true surface of the turned shank is gripped tightly by the Precision Chuck, keeping the bit in rigid alignment and preventing pulling out. The slotted end which fits over a key in the Chuck prevents turning.

The Russell Jennings line of Carpenter's Tools also includes new braces, having either the Precision Chuck for Precision shank only, or the Universal Precision Chuck for both ordinary and Precision Shank. Other tools are a solid head expansive bit with a cutter which can't creep, a bit extension that stays in place, screw-drivers, counter-sinks, etc.

Your hardware dealer will be glad to show you these tools,
which are sold separately or in convenient sets

The Russell Jennings Mfg. Co.
CHESTER, CONN.

THE BUILDING AGE

NEW YORK, APRIL, 1913

A COTTAGE OF BRICK VENEER CONSTRUCTION

A Design of Compact Arrangement and Attractive Exterior—Cypress
and Oak Used for Interior Finish—Cost About \$4,000

THE cleverly managed design which constitutes the basis of the present article with its accompanying illustrations is a story-and-a-half cottage of brick veneer construction, embodying an arrangement of rooms which cannot fail to interest a large class of readers. Noticeable features are the open side

footings and basement walls are of concrete composed of one part Universal Portland cement, three parts sand and five parts gravel. All concrete walls are plastered on the outside with Portland cement mortar from grade line to the top of the footings.

The four sides of the cottage up to the cornice line

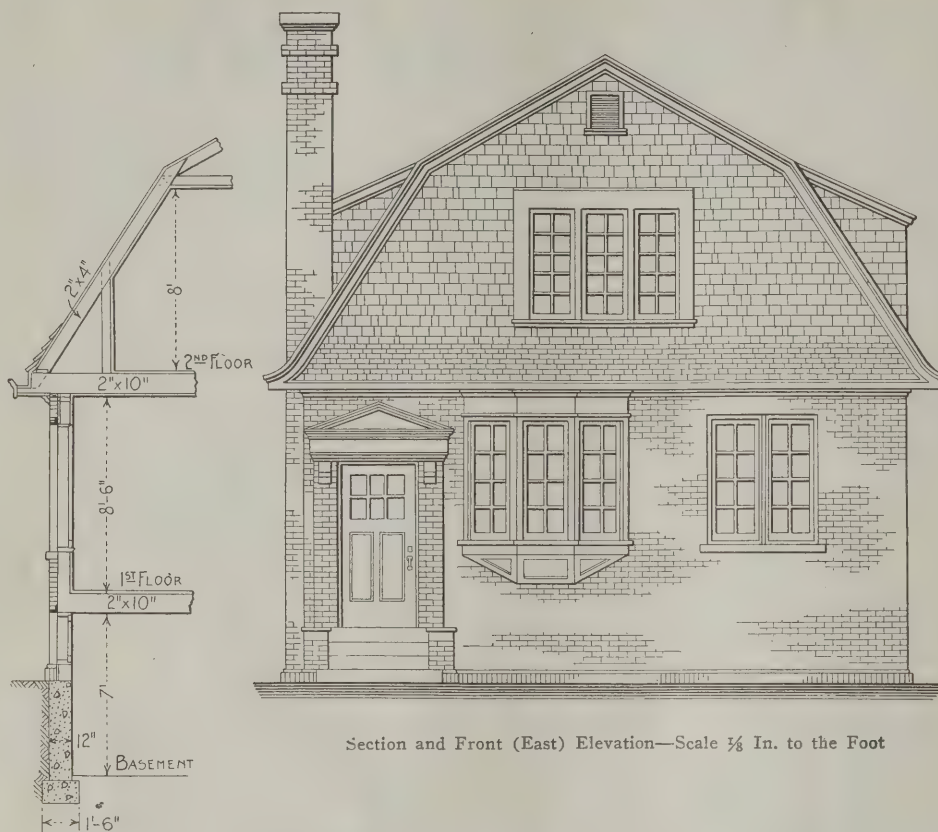
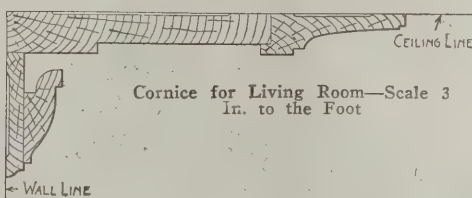


Photographic View of the Cottage of Mr. James O. Smith at River Forest, Ill.—Perry & Thomas, Architects, Chicago, Ill.

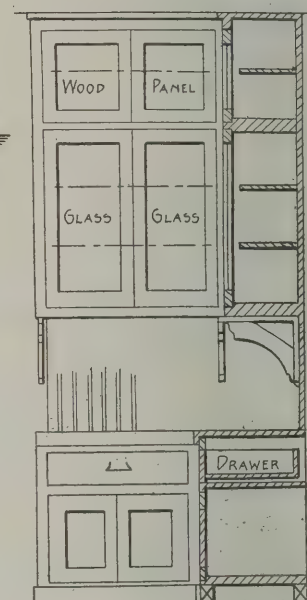
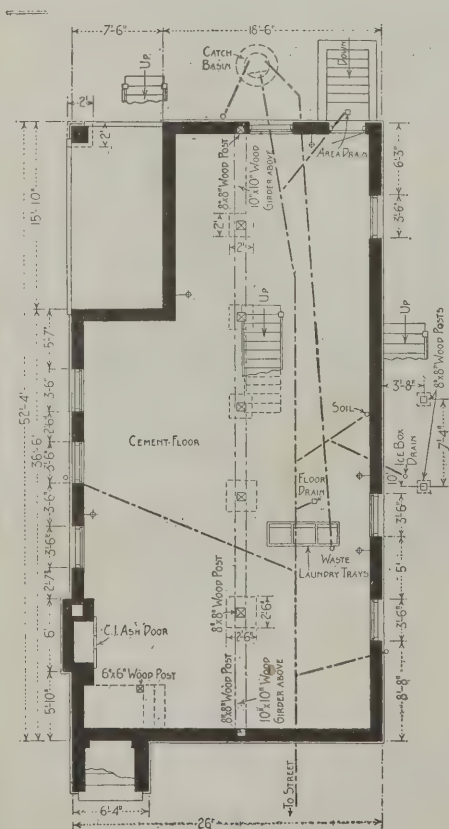
porch giving direct communication to the dining-room from the outside; the location of the master's room at the rear, and the position of the kitchen with its entrance at the side of the house. On the second floor are three bedrooms lighted by dormer windows at the sides and the triple window in the front gable.

According to the specifications of the architects the

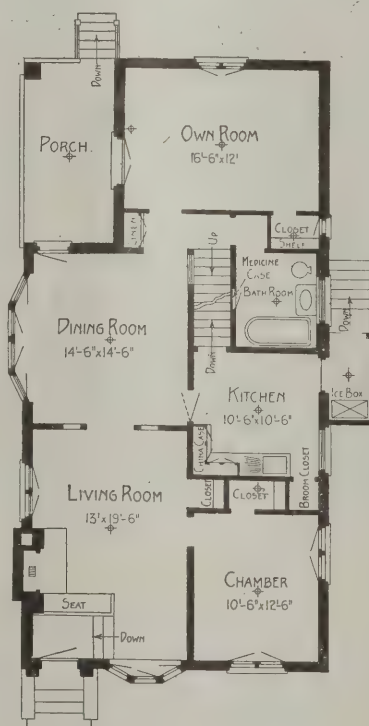
except where shingles are indicated on the drawings, the chimneys and the side walls of the front steps are veneered with \$14 paving brick. The brick veneer is laid in running bond and tied to the wooden walls of the house with metal ties every fifth course and every other brick is tied in the course. The brick facing is laid in a solid bed of mortar $\frac{1}{2}$ in. thick with

Section and Front (East) Elevation—Scale $\frac{3}{8}$ In. to the Foot

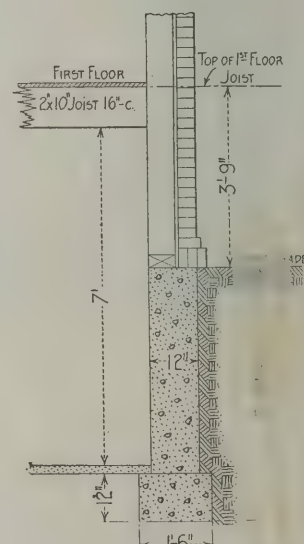
Cornice for Living Room—Scale 3 In. to the Foot

Elevation and Section of China Case in Kitchen—Scale $\frac{3}{8}$ In. to the Foot

Basement Plan—Scale 1/16 In. to the Foot



First Floor Plan—Scale 1/16 In. to the Foot

Section Through Foundation Wall—Scale $\frac{1}{4}$ In. to the Foot

a slightly reversed tooled joint, presenting a bold workmanlike appearance and in strong contrast with the brick.

The chimney of brick shown in the half-tone engraving is built with alternating headers and stretchers

with a mold as indicated on the details on another page.

The side and rear outside door-frames are $1\frac{3}{4}$ in. thick rabbeted to receive $1\frac{3}{4}$ in. doors. The frame is of white pine and back sawed. The front door and frame is of oak rabbeted for a $2\frac{1}{4}$ -in. door, the latter being of red oak veneered with $\frac{3}{8}$ -in. stuff. The casement doors in dining-room are of oak, veneered both sides, and all interior doors on the first floor are of oak veneer.

The basement has a floor of $3\frac{1}{2}$ -in. concrete, composed of a mixture of one part Universal Portland cement, three parts Lake Torpedo sand and five parts of coarse gravel. This is finished with a mixture of one to two of cement and sharp sand $\frac{1}{2}$ in. thick.

The under floor of the first and second story is of $\frac{7}{8}$ x 6-in. hemlock on which is placed a layer of extra heavy rosin paper, the edges of which are turned up 6 in. against the studding at the floor. The same quality of paper is also used to cover the entire sheathing of the building. All finish flooring is of $\frac{7}{8}$ x $2\frac{1}{4}$ -in. face, tongued and grooved and toe nailed. In all rooms on the first floor except kitchen entry way and broom closet, the finish floors are of red oak. In the kitchen

and pantry they are of maple and on the second floor Georgia pine.

The living-room, dining-room and main stairs are finished in red oak, the balance of the building being finished in cypress.

every fifth course. There is a 12 x 12-in. flue for the mantel and one of the same size for the furnace, both lined with tile flue lining.

All rough lumber throughout is No. 1 hemlock. The first and second-floor joists are 2 x 10-in., placed 16 in. on centers; the outside studs are 2 x 6 in. and the partition studs are 2 x 4 in., placed 16 in. on centers. All corners and angles are solid and around stairways and chimneys the joists are doubled.

The outside of the frame is covered with dressed and matched hemlock sheathing and the roofs and gables, where indicated, are covered with Star-A-Star red cedar shingles laid $4\frac{1}{2}$ in. to the weather and secured in place with galvanized iron nails.

The main roofs are shingled, but those of the porch and side entrance are covered with 1 x 6-in. dressed and matched pine sheathing over which is placed a layer of Bird's Neponset waterproof paper, this in turn being covered with 16-oz. canvas.

The exterior finish is of No. 1 white pine. All porch floors are finished with $1\frac{1}{8}$ x $2\frac{1}{2}$ -in. face spruce laid in white lead with base at the wall. The side and rear porch steps are of cypress $1\frac{3}{4}$ in. thick. The joists for the first story rear and side porch are 2 x 8 in., placed 16 in. on centers and bridged.

The porch and roof soffits are finished with $\frac{7}{8}$ x $2\frac{1}{4}$ in. matched and beaded white pine ceiling stuff finished

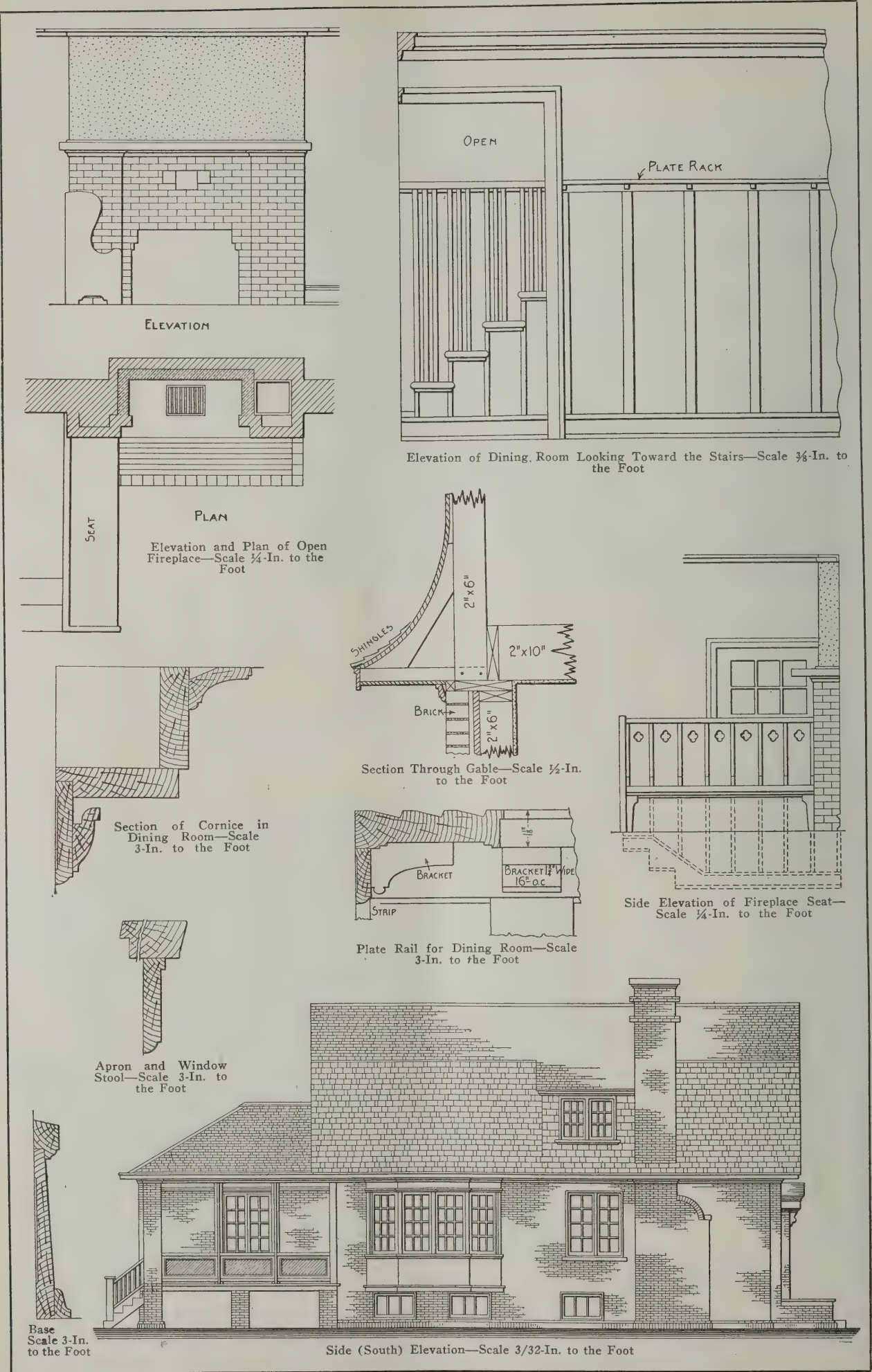
The fireplace in the living-room is laid up with pressed brick having $\frac{3}{16}$ -in. joints. In building the cottage several slight departures from the original drawings were made, one of the more noticeable being the omission of the seat at the left of the open fireplace



A Cottage of Brick Veneer Construction—View in Living-Room Looking Toward the Open Fireplace



View in Dining-Room Looking Toward the Living-Room



Miscellaneous Constructive Details of a Cottage of Brick Veneer Construction

and the utilization of the space represented by the width of the seat for a bookcase, all as shown in the interior view in the living-room looking toward the open fireplace. In the details on page 156 the elevation and plan of the open fireplace and mantel show the original arrangement and there is also given a side elevation of the fireplace seat as seen when looking toward the front door, which is just beyond.

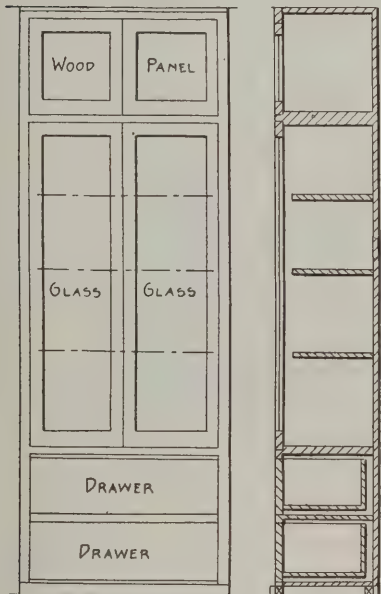
All walls, ceilings and partitions in the first story are lathed and plastered, as is also the ceiling of the basement. The plastering above the basement is two-coat work, the first coat being of brown mortar and the second coat in living-room, dining-room, vestibule and hall of sand finish. The 5-ft. wainscoting in the kitchen and the 6-ft. wainscoting in the bath-room is of prepared Acme cement put on in accordance with the directions of the manufacturers and struck in imitation of tile.

In the basement are Wolff's Columbian porcelain laundry tubs and in the kitchen is a 22 x 36-in. enamelled iron sink of the same make.

The bath-room is fitted with a 5-ft. "Corona" bath

count the steadily rising prices of building materials; second, under-estimating, and, third, taking business beyond the capacity of their resources through the process of "bunching." At attempt has been made to attribute some of these failures to slowness of steel deliveries, but those who are in close touch with the credit market say that this factor, instead of being potent, is only mildly contributive.

Basic construction conditions are excellent. The real estate market is more active than it has been in almost six months. Building money is comparatively easy, especially for gilt-edged propositions; and the building material market is firm, with mill supplies conservatively low, prices stiffening, and the distributing market well stocked. Dodge reports show a healthy tone in the matter of prospective building operations throughout the entire metropolitan district, and architects as a rule report full boards. Such being the case, delay in deliveries of structural material, while possibly temporarily embarrassing to contracting firms by reason of withholding of process payments, should not precipitate a sound building firm. The real causes



Elevation and Section of Linen Closet—
Scale $\frac{1}{4}$ -in. to the Foot



A Rear View of the Cottage Showing Open Side Porch

A Cottage of Brick Veneer Construction

tub and a "Superior" syphon-jet water-closets with low tank and nickel-plated trimmings.

The house is piped for gas and wired for electricity, the work being done in accordance with the rules and regulations of the Electrical Department of the city of Chicago.

The cottage here shown was erected for James O. Smith on Thatcher Avenue near Lake Street, River Forest, Ill., in accordance with plans prepared by Perry & Thomas, architects, 646 Marquette Building, Chicago, Ill.

Failures Among Building Contractors

Some of the reasons which have been instrumental in causing recent failures in close sequence among building and engineering contractors of more or less prominence are set forth in a very interesting article in the *Record and Guide*, and from it we take the following:

The primary factors in the troubles of firms suffering business embarrassment at this time are three: First, failure on the part of those figuring jobs to dis-

count the steadily rising prices of building materials.

Competition among building contractors and engineering companies in recent years has been very keen. So many new concerns with limited resources have entered the building field that established houses have had to depend largely upon old customers and upon their reputations for reliability for new contracts. The result has been a partial recognition, at least, of what has come to be the "unwritten law" among contractors.

This code of ethics sharply defines three important classifications of building contractors: the "big" firm, the "small" contractor and the speculative builder. The first classification embraces those firms which have good connections, whose stability is founded upon prestige, reputation and earned dividends, while the second class refers to that army of builders, the majority of whom are financially sound, but whose resources and capacity are limited, and the last is made up by speculators who do construction work and leave a large part of their money in the finished structure.

The small contractor, pushed hard to keep enough business in hand to hold his organization together, is sometimes tempted to ape the big firms and "bunch" a number of operations simultaneously. He figures that

by averaging his profits on all his jobs he can afford to accept a smaller profit on each building because his aggregate will, in a measure at least, compensate him.

Suddenly some branch of the building material market reports an advance in price between the time his bid went in and the time he specifies on his contract, or when the building is actually ready for the superstructure steel or some other commodity is delayed in delivery and his payments are held up. The material man reneges, and the result is he cannot promptly meet his obligations.

But building material and contracting interests were not inclined seriously to consider this phase of the matter at this time. They flatly put it down to a combination of circumstances that may be classified as plain bad business luck, superinduced by inevitable results of price-cutting competition and failure to take into the matter the increased cost of building materials and construction.

Building contractors are going into bids on an unprecedented material market. During the last five years, during which time no less than two hundred and twenty new construction concerns of one kind or another have come into existence, the average cost of building construction and building materials has advanced between fifteen and eighteen per cent, most of which has occurred within the last nine months.

During the last two years common brick has moved up from \$5.75 a thousand, wholesale, to \$6.75 and \$7 (summer quotations.) Portland cement two years ago this spring was as low as 70 cents a barrel, Lehigh Valley, while the prospects are that it will be considerably over a dollar a barrel before the spring building season actually starts. Structural steel, two years ago, was considered high at \$27, while to-day it is stiff at \$31. Lumber, in all departments, has advanced at least five per cent since 1909, and this week's reports show that practically all lines will move to even higher levels than have heretofore existed when the spring season opens. Stone, sand, roofing, equipment and labor all cost more today, and the increasing demand for fireproof construction only tends to make the cost of construction move higher.

In the face of this sharp rise in material prices, competition has been such as to force construction prices down, and the inevitable consequence has been smaller profits, if not actual losses.

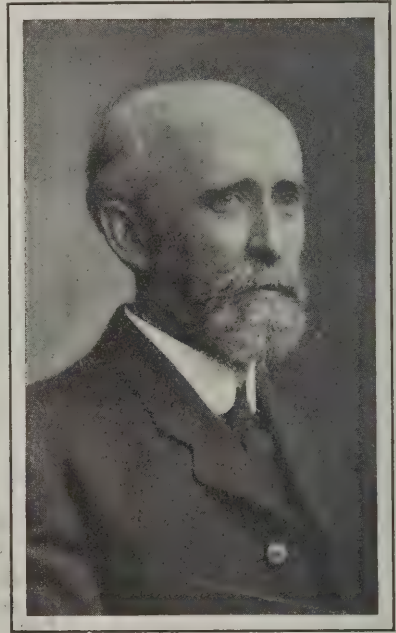
There are three elements to every building operation, whether it be large or small: cost, quality, speed. If one of these factors is crowded out of the equation or even cramped, one of the remaining two, or both, must suffer. Slowly, but surely, this fact is coming to be realized by owners. But until it becomes universally recognized as the only sound working basis for constructing buildings, contractors are going to be caught short, owners are going to have their buildings tied up, and building material interests are going to suffer great uneasiness if commodity prices undermine heavily loaded firms whose resources are not sufficient to tide them over a tight place.

The old saying that "there is nothing new under the sun" is well exemplified in the discovery that a four-story bank building erected in the city of Providence, R. I., in 1823 showed when it was demolished recently that use was made in its construction of the skeleton frame principle. It goes without saying that steel construction was unknown in 1823, but in the building wooden timbers were used instead of steel in very much the way that steel is employed in our modern skyscrapers. The skeleton building in question was erected on huge logs of spruce, while the brick front with its granite facing was tied to the frame with great bolts at each floor.

New President of Ohio State Association of Builders Exchanges

In connection with the report of the seventh annual convention of the Ohio State Association of Builders Exchanges held in Cincinnati on February 11, 1913, and published in our issue for March, mention was made of the fact that John W. Boren of Dayton, Ohio, was elected president for the ensuing year. In order that members of the affiliated bodies and others interested who have never had the pleasure of meeting the new president, may feel somewhat acquainted with him we present herewith an excellent likeness reproduced from a recent photograph.

Mr. Boren is one of the prominent citizens and business men of Dayton and is identified with various



John W. Boren, President of the Ohio State Association of Building Exchanges

public and semi-public organizations and institutions in that city. He is engaged in the business of brick manufacture and is an enthusiast in the work of organization among the builders.

He served as vice-president of the Ohio State Association of Builders Exchanges for a year previous to his election as president. He is also president of the Dayton Builders Exchange and for several years past has been a director of that organization. He is exceedingly popular not only as a presiding officer, but in all his business relations and is held in high esteem by all who know him.

One of the most imposing of the new buildings planned for Atlanta, Ga., is the 17-story structure now being erected at Edgewood Avenue and Exchange Place, in accordance with plans prepared by Architect J. E. R. Carpenter of New York City. The cost is placed at \$700,000 and it is expected to have the building ready for occupancy early next fall. The Realty Construction Company, Birmingham, Ala., has the contract.

The United States Department of Agriculture has decided to discontinue publication by the Forest Service of its quarterly issue of mill and wholesale lumber prices. This course has been adopted because the government considers it unnecessary to continue the work in view of the extent to which private agencies are now collecting lumber price data.

A COMBINATION BOOKCASE AND WRITING DESK

A Design Executed in the "Mission" Style and of Special Interest to the Carpenter and Cabinet Maker—Details of the Work

By PAUL D. OTTER

IN running over the pages of the last issue of *The Building Age* and especially of the Correspondence Department I noticed the query of a Pennsylvania correspondent who desired to obtain a design of a combination bookcase and writing desk in the "Mission" style. In reply to that request I am sending the accompanying sketches showing in Fig. 1 a form of construction which may attract the interest of those who may desire a serviceable piece of furniture which will harmonize with the "Mission" or modified "Mission" furnishings. As shown in the sketch there are two book shelves at each side of the writing desk with an overhead continuation of book shelving having a set hight for smaller books. According to the half car-case plan in Fig. 2 the position of the corner and intermediate posts are clearly indicated, leaving an open foot space in the middle front under the desk as may be seen from an inspection of Fig. 1.

The connection between the four book posts is made by constructing three paneled frames of $\frac{3}{4}$ in.

ness as may be desired. After the bottom boards are fitted over the curved apron under the bookcase the construction will then be far enough along to make and fit two doors which are frames made $\frac{3}{4} \times 2\frac{3}{4}$ in. when finished. Above the desk compartment it will be noticed there is a continuation of the book shelf space measuring 9 in. in high provided also with two glass doors $9 \times 15\frac{1}{4}$ in., meeting in the middle of the entire case. These doors are made of the same framing as the two larger side door frames; that is $\frac{3}{4} \times 2\frac{3}{4}$ in.

Four loose fitting shelf boards $\frac{3}{4}$ in. thick will about divide the space properly for books of varying heights, the shelves being adjusted and held to different spacing by the small metal rests inserted in holes in the posts or on the inside of the ends.

The writing table is 30 in. high (if casters are used allow for them) and the writing flap proper is the front cover of the desk set on hinges to the writing bed and held down, being held in a horizontal manner by elbow joined brackets made for this purpose.



Fig. 1—General View of the Combination Bookcase and Writing Desk

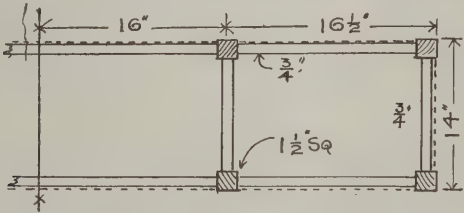


Fig. 2—One-half Car-case Plan

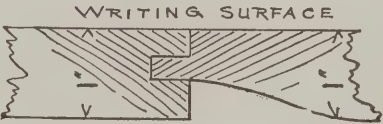


Fig. 3—Showing Section of Writing Panel

Combination Bookcase and Writing Desk—By Paul D. Otter

material and stiles and rails $2\frac{1}{2}$ in. wide. The stiles project and are fitted with tenons, the top and bottom to enter mortise cuts in the posts, which are $1\frac{1}{2}$ in. square and 56 in. long. In laying out a rough working drawing the outside measure of the case will be 14×65 in. and the top board arranged to fit in about the top of the posts and secured to the top of the back and side framing, will measure when finished $1 \times 13\frac{3}{8} \times 64\frac{3}{4}$ in.

The end rails of the bookcase, top and bottom, are provided with sufficiently long tenons to pierce the thickness of the posts front and back and be chamfered off with a dull taper. To further secure the framing holes may be bored after gluing up to provide for two dowel pins to each joint, these being smoothed off flush in the final finish. The end filling consists of a middle mullion over-laying the joint of two thinner panels or it may be a panel of one thick-

As a becoming cover for such a piece of furniture a framed-up panel door $\frac{7}{8} \times 15 \times 30\frac{1}{2}$ in., the framing of an even width of 3 in. for stiles and rails, could be made, which, before gluing up, fit with an inserted panel having the front face treated with a long low ogee shape similar to the back of a violin—see section in Fig. 3. This can be brought about by the use of a paper template and a curved spoke shave or gouges and a steel scraper.

The two side compartments measure 7×9 in. outside with a depth of 9 in. They are made of $\frac{5}{16}$ in. material and have two lower drawers with a front width of $2\frac{1}{4}$ in. The center compartment, $5\frac{1}{4} \times 16\frac{1}{2}$ in., may be divided into vertical compartments by $\frac{1}{4}$ in. panels suitable for holding the larger size business envelopes, or some of this space may offer room for two more smaller drawers, according to individual desire.

BUNGALOW FOR ERECTION AT THE SEASHORE

Plans, Elevations and Details of Bungalow Forming the Basis
of Our Color Cover Design This Month

THE color design which adorns the front cover of this issue of the paper relates to a bungalow that has been planned for erection at the seashore or the lakeside, according to the preference of the owner. It will be seen from the plans and elevations on the facing page that there is a veranda extending around two sides of the building, each of which looks out upon the water. The plan is compact and gives upon the main floor a spacious living room with beamed ceiling and paneled walls, two bedrooms, a bath room and kitchen which communicates with the dining room end of the living room through a commodious pantry. The veranda at this part of the house can be screened in summer and glazed in winter. Under this arrangement there is provided an ideal place to dine, owing to the easy access from the kitchen.

The bedrooms are of good size, are provided with plenty of closet room and are well situated as regards the bath room, which opens on the small hall, thus insuring the greatest privacy. All the rooms are sufficiently ventilated and have abundance of light.

Only one chimney is necessary in this house and it supplies the furnace in the cellar, the range in the kitchen and the open fireplace in the living room.

The kitchen is well arranged with tubs, sink and dresser in one line, while the easy access to the cellar from the kitchen and the outside makes this part of the house very convenient. Only one line of plumbing is required here, which is quite a saving in cost.

On the second floor is a large and a small bedroom with plenty of closet and storage room, which in every house is a valuable asset.

The house is designed for two adults and two children, with ample room for guests and maid. It is intended for a lot having a frontage of 75 or 100 ft.

Only a portion of the site is excavated, as will be seen from an inspection of the foundation or cellar plan. The foundation walls are of 10 in. concrete with 10 in. thick and 22 in. wide concrete footings. The cellar floor is of 3-in. concrete, finishing with a top dressing of 1 in. of cement.

All interior walls are plastered two coats with a sand finish. The attic rooms have hard, smooth finish.

The chimney is built of common brick laid in cement mortar and the flues lined with vitrified flue lining. Above the roof the chimney is stucco finish the same as the exterior walls of the building. The chimney breast below the mantel shelf and hearth is of 6 x 6 in. red tile.

The exterior walls of the house are covered with two coats of stucco on wood lath, the stucco having a light cream tint with a sand finish.

All timber is of spruce and the double floors throughout the house are of North Carolina pine.

The floor joists are 2 x 10 in. placed 16 in. on centers; the rafters 2 x 6 in. placed 20 in. on centers; the studs 2 x 4 in. placed 16 in. on centers; the plates and corner posts are 4 x 4 in. and the sills are 4 x 6 in.

The doors and trim are of cypress and the window and door frames as well as all sash and outside trim are of white pine.

The roof is laid with red cedar shingles exposed 5½ in. to the weather.

In the bath room are porcelain enameled fixtures, all exposed pipes having a nickel plated finish. In the kitchen are earthenware trays and an iron enameled

sink, a combination coal and gas range and a 40-gallon galvanized iron boiler.

The house is heated by steam and is wired for electricity and piped for gas. All hardware throughout the house is of bronze plate finish.

The walls on the first floor are tinted. The living room trim is stained and rubbed to a smooth dull finish. The floors are varnished and waxed. All other rooms are painted two coats and shingles are dipped in stain. The sheet metal work is painted two coats of red lead on both sides. All outside trim is painted two coats of white lead.

The size of house is 28 x 44 ft. and approximate height 20 ft., which gives 24,640 cu. ft. The porch has 2,369 cu. ft., making a total of 27,009 cu. ft. Figuring the cost on the basis of 14 cents per cu. ft. equals \$3,781.26.

According to the architect this bungalow can be built in some parts of the country for about \$3,400. It is, however, figured in a locality where the cost of labor and material is approximately high.

Detailed Estimate of Material and Labor

Excavating and grading.....	\$170.00
Masonry work, including concrete footings, foundation walls, chimney and fireplace....	356.00
Plastering exterior and interior.....	558.50
Carpentry work, including lumber bill, mill work, etc.....	1,625.00
Hardware	75.00
Metal work.....	70.50
Plumbing and gas fitting.....	210.00
Heating	350.00
Electric wiring.....	65.50
Painting, staining and tinting.....	270.00
Combination lighting fixtures.....	50.00
	\$3,800.50

This includes contractor's 10 per cent. profit.

The seashore bungalow here illustrated and described was designed by Arthur Weindorf, architect, of Long Island City, N. Y.

Restriction of Apprenticeship Unlawful

A bill making it unlawful for any person or association of persons to prevent or attempt or combine to prevent any individual from learning or becoming an apprentice for the purpose of learning any useful and lawful trade or to perform any act which shall result in restricting a number of individuals who may learn or become apprenticed for this purpose; or in any way interfere with the enrolment as an apprentice, or the employment of any individual desiring to learn or acquiring a useful and lawful trade, was introduced in the New Jersey Legislature in February.

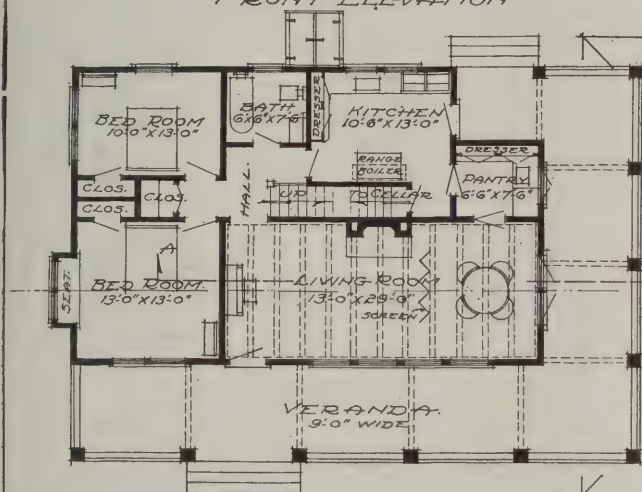
The latest addition to the colony of imposing apartment houses on University Heights, New York City, is the 12-story structure about being erected at the corner of Amsterdam avenue and 120th street, New York City, the plans for which were recently filed by Architects Schwartz & Gross. The structure will be of concrete with a facade of terra cotta bricks. It is estimated that \$450,000 will be expended.



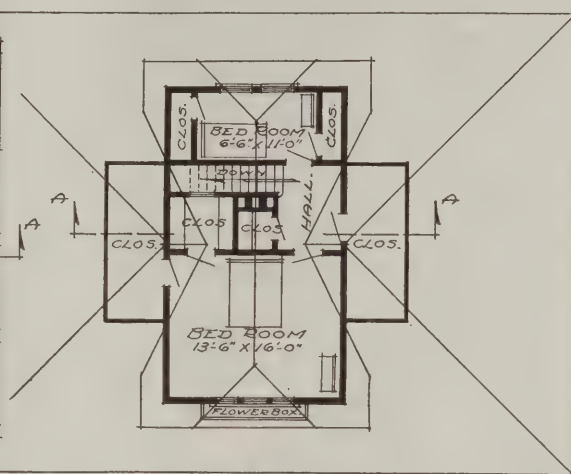
FRONT ELEVATION



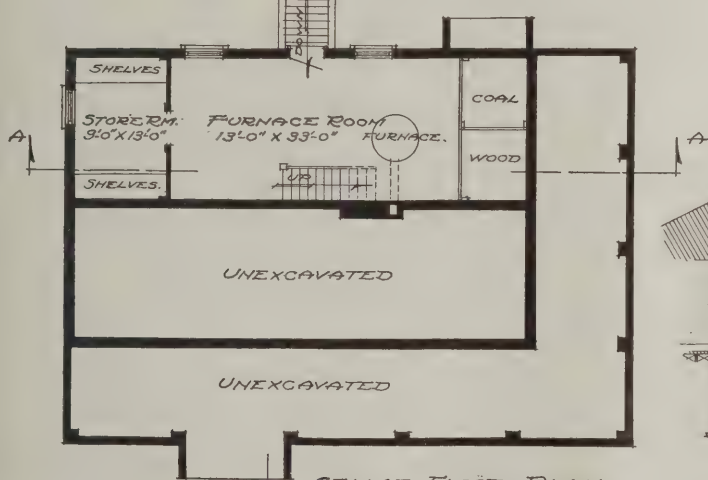
SIDE ELEVATION.



FIRST FLOOR PLAN



ATTIC FLOOR PLAN.



CELLAR FLOOR PLAN.



SECTION ON LINE A-A.



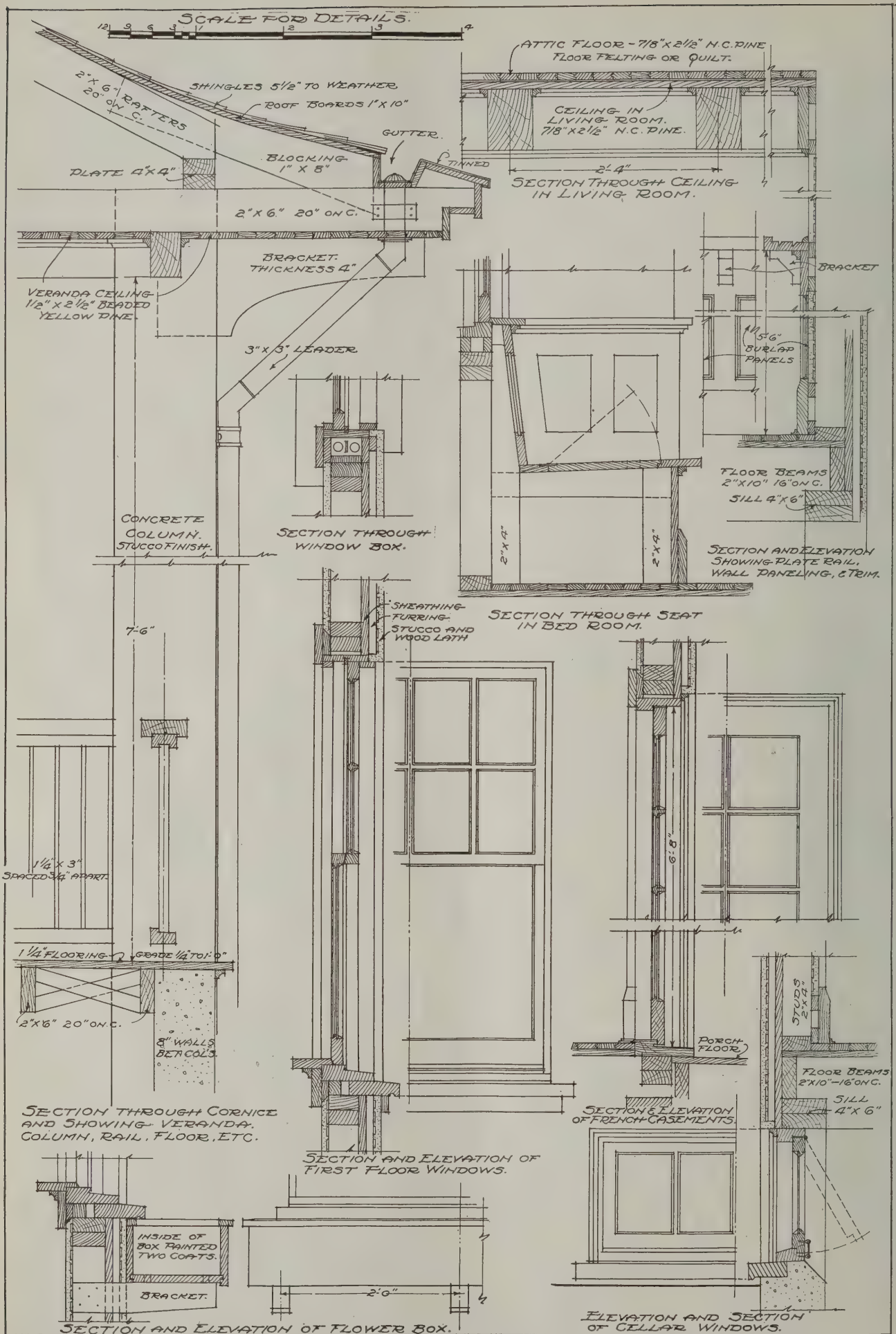
SIDE ELEVATION.



REAR ELEVATION.

AWEINDORT, ARCH'T.
L.I. CITY, N.Y.

SCALE FOR PLANS AND ELEVATIONS.
0 1 2 3 4 5 6 7 8 9 10



Miscellaneous Constructive Details of the Seashore Bungalow, Shown on the Front Cover

SOME OF THE BENEFITS OF A BUILDERS EXCHANGE

What a Properly Managed Builders Exchange Can Accomplish—The Contractor of the Future—Licensing Architects and Building Contractors



THE members of the Toledo Builders Exchange held a most interesting meeting on Friday evening, March 7, which was known as "Architects' Night." The principal address of the evening was by Edward A. Roberts, secretary of the Ohio State Association of Builders Exchanges, and also of the Builders Exchange at Cleveland, Ohio, who spoke on "Benefits of a Builders Exchange to the Architect and to the Builder." The following copious extracts cannot fail to be of interest to many of our readers:

Time was when a builders exchange was not considered much of an institution in the city where it existed, being regarded largely by the public as a mere "hang-out" for contractors. In later years, however, the exchanges have had what the architects term a renaissance, or as others might call it, a reformation. In this period the exchanges have come to be regarded as business centers for builders where all of the activities of the building industry of the city heads up. For the last ten years the exchanges in this state have developed rapidly in their usefulness to members. Nearly all of them, now numbering ten, have attractive and comfortable quarters; nearly all of them have paid secretaries who are constantly on duty planning and working for the good of their organizations. In nearly all—whether large or small—the benefits are practically the same, and result from the mutual co-operation of the members wisely directed.

Supposed Function of an Exchange

Until recently it has been thought sufficient if an exchange kept its headquarters open and gave members the use of telephones and writing facilities, looked after building regulations, adopted an occasional resolution on the labor subject, held a meeting now and then and obtained a few sets of plans for the members to figure. While all this was good, it hardly came up to the needs of the present day. Just as the automobile has taken the place of the old horse and buggy, and the modern concrete mixer has followed the mixing box, has the demand for a more effective form of organization arisen.

Building is no longer a trade—it is a science, and those who engage in it must be wide awake and up to the minute, if they are to succeed. The modern exchange should fill the dual capacity of being a clearing house for ideas and a protective agency for all its members. Therefore, to-day our builders' organizations throughout the country are discussing the real questions that bear upon their business. From time immemorial building contracting has been based on open and indiscriminate competition. While this reduces the business to little more than a gamble there seems to be no way of avoiding it save in cases where the percentage or a similar scheme is adopted.

A builders exchange primarily affords a direct benefit to its members in softening the feeling among competitors. The modern idea is not to annihilate your competitor but to get as close to him as you can. Study his methods and improve upon them. If he gets a job away from you, find out where the fault lies,

and next time be ready for him. Builders cannot engage in illegal combination, but they can do a great deal through legitimate organization to improve their condition.

Call for Modern Methods

I believe the call of the day is for up-to-date business methods in the contracting line. The business is enlisting a higher grade of men all the time, and it is up to everyone engaged in it to do his best to raise the standard of dealing. I have been surprised to note how many young men with college and technical education are now engaging in building. Among the members of our exchange is a graduate of Harvard University, several graduates of Cornell, where a special course in contracting is available; several men from Case School of Applied Science, the Ohio State University and other colleges of like standing. While these men may be characterized as belonging to higher education in the contracting world, they emphasize the trend of the times.

The contractor of the future must give more time to study if he is to keep in the front ranks. He need not go to college, for the business of building is of itself an education. He must, however, take up the problems that confront him and work out their best solution with brains. We are hearing now much about the subject of efficiency, many books are being written on it, and lectures delivered about it. No trade is so much in need of advice in this time as the contracting trade. Instead of sitting around finding fault with each other and with conditions in general the builders through their organizations should be studying such subjects as the keeping of cost, overhead expense, avoiding losses on the job, how to get the best results through co-operation of foremen and workmen, taking of discounts, prompt collection of estimates, best paying work and practical topics similar to those the manufacturer and merchant are investigating and trying earnestly to solve.

Material Dealers Ahead of the Contractors

The material dealers are ahead of the contractors in this respect. At their meetings nowadays they are considering the subject of credits, best methods of delivery, yard facilities, distribution charges and similar problems. In addition then to the recognized benefits of an exchange to the builder are these advantages and opportunities which are far greater and more helpful than he can obtain through any other source or association, for they directly concern his ability to make a profit in the business from which he obtains his living. To my mind a builders exchange should be the first organization a builder should join; the last he should give up.

Now a word about the benefit of an exchange to the architect. I believe that any organization that tends to make better builders is of inestimable value to the architect. A good architect may get a fairly good job with a poor contractor, but he has to work mighty hard to do it. From my observations I have learned that good architects usually surround themselves with good contractors and that bad architects usually seek their kind. A builders exchange, if it is properly managed, elevates the business of contracting and therefore helps the architect. Since the architects are organized in most every city it is of benefit to them to deal with organizations of builders in considering building regulations and rules of practice. Recently several joint

committees between the architects' chapters and the exchanges have been formed for this specific purpose. Even in the staid city of Boston, where the first association of architects is said to have been formed and where the spirit is ultra conservative, such a joint committee of thirty members is now at work on an elaborate report on the proper relationship between architect and builder. A like committee has been formed in Cleveland and is now considering the revision of the city building code, holding regular weekly meetings. The usefulness of such a medium has been proven in the work of the joint committee representing all of the architects, builders, engineers and building officials of this state who have united in a recommendation on the proposed state building code.

Benefits to the Architect

A builders exchange is of much benefit to the architect as an agency for handling the many disputes which arise on a building during the course of its erection. More and more the necessity of compact organization to adjust difficulties with labor is becoming manifest. As a rule the contractor assumes all the risk in this regard and surely he should have the moral support of the architect and owner in time of need. The better the organization on the part of contractors the less likelihood there will be of trouble in executing the architect's plans. Through an exchange the architect may obtain much valuable information and by using its facilities he may relieve his office greatly in disseminating information he may wish to give out. In some cities, notably in Columbus, daily use of the exchange is made for obtaining bids, all the architects of that city filing plans in the exchange rooms for estimating.

Benefits to the Contractor

I would like to comment on how the individual contractor is often of benefit to the individual architect, but that phase of the subject is assigned to another. I cannot refrain, however, from referring to the unbounded confidence the ordinary architect places in the ordinary contractor, to supply everything that is left out or to correct any mistake in the plans and specifications that may have been made, and do all this at the same price as though it all were stipulated in the first place. Such practices as this have caused some of our humorously inclined builders in Cleveland to designate their bidding instructions as "Plans and Speculations" instead of plans and specifications. I cannot help but deplore the tendency of modern architecture which really does not deserve that name except to a moderate extent. There are too many managers of "plan factories" in the architectural business. At the same time I am willing to admit that there are too many bungling builders.

I am not so sure that the time will come when a system of licensing architects in this state after a careful examination as to their competency will be required by statute as it is in certain other states and that the same system will be applied to building contractors. An ordinance for the latter plan was drawn for the city of Boston a year or so ago. If passed, this legislation will set a precedent for other communities. Such a method of insuring fitness is now followed in this state in case of accountants, physicians, lawyers and other professions and why should not those who design and erect the buildings where all the people are housed either at home or at work be likewise protected.

Whether this comes about or not, it behooves all organizations of both builders and architects to be ever alert and active to advance the best interests of the calling in which they are engaged and to constantly remember that any practice which hurts one branch of the building business hurts the business as a whole, and that whatever benefits one, benefits all for the interests of both are mutual.

Substitutes of Circassian Walnut

One of the world's best known and most expensive cabinet woods is Circassian walnut, and of it the United States is probably the largest consumer. The high cost of Circassian is due to the scarcity of the beautifully figured variety demanded for interior finish of houses and for furniture, for the tree itself is more widely distributed than almost any other of commercial importance, says the Department of Agriculture. The demand for the best wood, however, has always outrun the supply. Even in the eighteenth century when wars in Europe were frequent, so much Circassian walnut was used for gunstocks that the supply was seriously depleted. Early in the nineteenth century the wood of 12,000 trees was used for this purpose alone. Single trees containing choice burls or fine bird's-eye figures have sold for more than \$3,000.

The tree is native to the eastern slopes of the Caucasus and ranges eastward to the foothills of the Himalaya Mountains, from which it extends southward to northern India and the mountains of upper Burma. It has been widely planted in Europe and the United States, in this country under the name of English walnut. The wood grown here, however, has not the qualities demanded by the cabinet and furniture maker. Much of the Circassian walnut now used comes from the Black Sea and from other parts of Asia.

According to a circular just issued by the Forest Service the demand for Circassian walnut has resulted in the substitution of other woods. Our own red gum is often sold as Circassian walnut, and butternut is also similar in general appearance to the less highly figured grades. Many good African, Asian, and South American woods resemble Circassian walnut, though none possesses the magnificent figure, delicate tones, and velvety texture of the latter. The circular discusses the supply and uses of Circassian walnut, and those who wish to know how possible substitutes may be distinguished can learn from this circular the distinctive marks which the Government's experts have discovered.

Dome of Wisconsin's New Capitol

The new Capitol which is under construction at Madison, Wis., will be distinguished above all others in the United States in one respect. Its Vermont granite dome will be the highest in America, and the second highest in the world, the only one to overtop it being that of St. Peter's at Rome. From the base of the dome to the flag pole the distance will be 300 ft., which is only 30 ft. less than the dome of St. Peter's.

Building	Height in Feet
St. Peter's	330
Wisconsin State Capitol	300
National Capitol at Washington	287½
Duomo, Milan	254
St. Paul's Cathedral, London	215
St. Sophia Mosque, Constantinople	201
Pantheon, Rome	143

The dome of Wisconsin's Capitol will be visible for a distance of 30 miles at night. Four searchlights will play on it from the wings.

Probably very few of the lovers of old New York realize that Washington Square, with its quaint dwelling houses suggesting the early Colonial days, was from 1789 to 1823 the Potter's Field of New York City. In other words, that where now stand the fountains, the Washington Memorial Arch, the asphalted walks and the homes of many aristocrats, the poor of the city were once buried in nameless graves by the thousands. Washington Square contains nine acres and was made a park in 1827 and improved in 1870.

A PLAN FOR A SMALL SANITARY DAIRY HOUSE

An Inexpensive Building Likely to Find Favor in the Rural Districts—
Outline of Construction and Equipment

WE present in the accompanying illustrations the plan for a small dairy house which, while fulfilling sanitary requirements, is at the same time inexpensive and well adapted for erection in the rural districts. Recent developments in dairying have created a growing demand for a dairy house of this character and for those who are striving to improve the quality of their products such a building is an absolute necessity. While the dairy house should be conveniently located so that the milkers do not have a long walk from the barn, it must be so placed that it is free from contaminating surroundings.

It should be built away from the barn on a well drained spot and the drainage of the dairy house itself

wash room and also to the milk room from the outside. The perspective view affords an idea of the appearance of the completed structure, while the cross section gives an idea of the inside finish.

The plan of dairy house here given was designed by Ernest Kelly and Karl E. Parks of the Dairy Division of the Bureau of Animal Industry of the United States Department of Agriculture.

In describing the requirements of such a dairy house it is stated that there should be a plentiful supply of cold, running water at the house, and if it is not possible to have a regular water system, the supply may be piped from an elevated tank fed by a hydraulic ram, engine, windmill or hand pump. The dairy man can



A Plan for a Small Sanitary Dairy House—General View of the Completed Structure

should be carried well away from the building. If possible the ground should slope from the dairy house toward the barn rather than the other way. The principal purpose in building a dairy house is to provide a place where dairy products may be handled apart from everything else. To carry out this idea it is necessary to divide the interior of the building so that it will not be necessary to wash the utensils in the same room where the milk is handled.

Thorough cleanliness must always be kept in mind and there should be therefore no unnecessary ledges or rough surfaces inside the building, so that it can be quickly and thoroughly cleaned. Ventilators are necessary to keep the air in the milk room fresh and free from musty and other undesirable odors, as well as to carry off the steam from the wash room. Windows are of prime importance, as they permit of the free access of fresh air, sunlight and facilitate work in general. In summer the doors and windows should be screened to keep out flies and other insects.

In the accompanying floor plan the wash room is shown in the center of the building with boiler room and fuel bins at the left and the milk room and cooling apparatus at the right. There is direct access to the

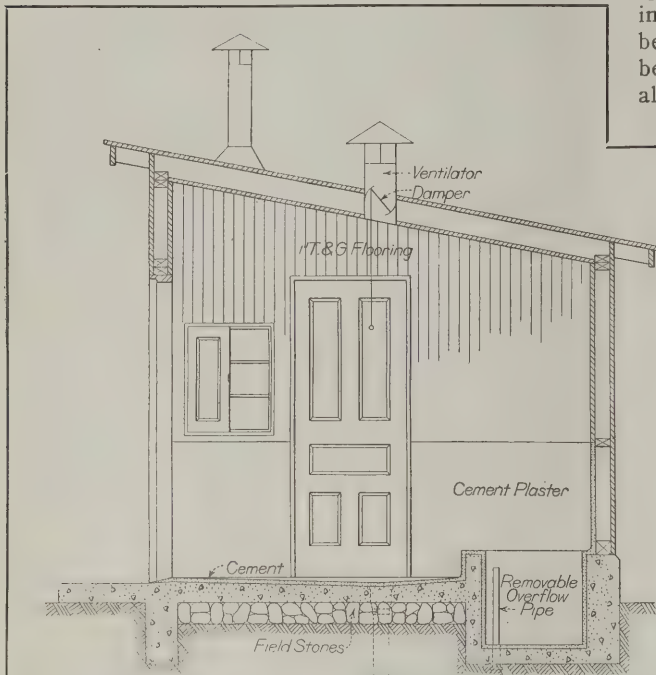
ill afford to spend his time in carrying water in a pail to cool his milk and wash his utensils. Again, for the proper sterilization of the utensils an abundance of steam or hot water is required. After the utensils are washed clean they should be either scalded with boiling water or steamed.

The dairy house should be so built that labor is economized to the greatest extent and to do this the building must be arranged so that unnecessary steps will be avoided. The plan here given is intended to meet the needs of the average small dairy that ships either milk or cream in cans. The plan is capable of considerable variation to adapt it to a wider sphere of usefulness.

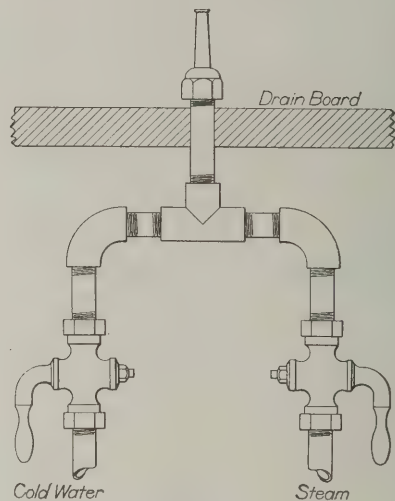
The building illustrated herewith is 20 ft. long, 10 ft. wide, 8 ft. 6 in. high in front and 6 ft. 6 in. high in the rear. It is covered with a shed roof. The exterior of the building may be covered with sheathing and building paper or weatherboarding and shingles, the deciding factors being expense, durability and appearance. The interior should be carefully finished so that the walls and ceilings may be smooth and free from corners or projections which might accumulate dust and dirt. The building should have a good concrete floor

pitched to drain through bell traps. The side walls as high as the windows should be plastered with cement plaster on metal lath. The remainder of the walls and ceiling may be covered with matched flooring and both

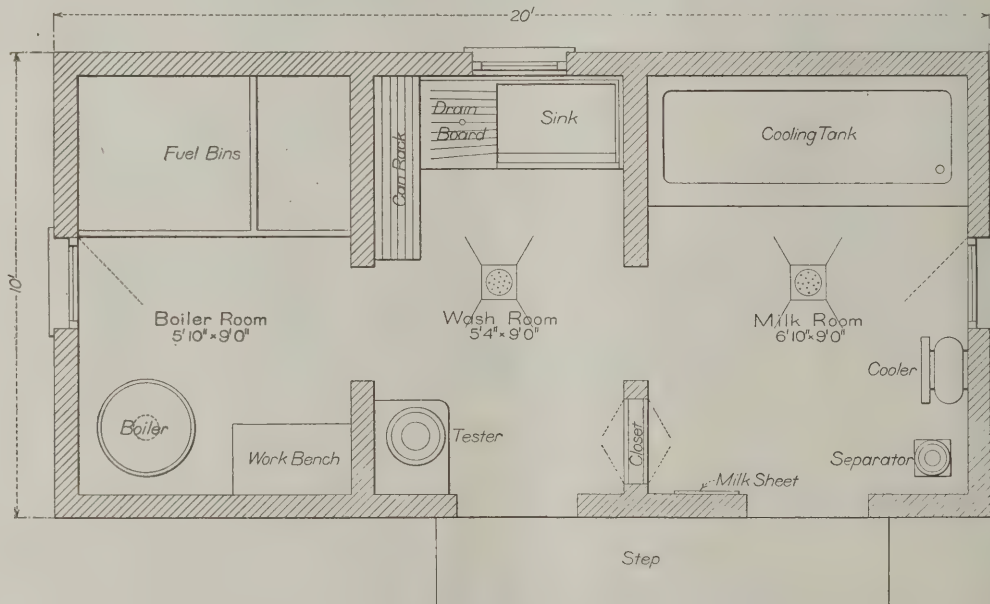
Referring again to the floor plan, the little closet in the wall between the milk room and the wash room is designed to hold bottles in which composite milk samples from each cow may be kept. The closet can be opened from either room, thus saving the labor of carrying the bottles from one room to another. A shelf may be built in the wash room over the tester, on which may be kept the glassware used in the Babcock test and also the scales for weighing out cream samples.



Vertical Cross Section through Building Showing Floor Construction and the Cooling Tank



Detail of Water and Steam Jet



Plan View Showing General Arrangement of the Rooms and Position of the Equipment

A Plan for a Small Sanitary Dairy House

walls and ceiling painted with a white, washable enamel paint. Ventilating flues should extend through the roof of the cooling room and wash room. The windows should be hinged and set to be flush with the inside wall when closed.

The equipment should consist of a $1\frac{1}{2}$ to 2 horse power vertical boiler to supply steam to the sink and to the steam jet in the drain board; a galvanized iron wash sink, a can rack, a Babcock tester, a concrete cooling tank, a milk cooler, and milk scales. A separator may also be located in the milk room if desired. A detail of the water and steam jet for rinsing and steaming the milk utensils is shown in the accompanying illustrations.

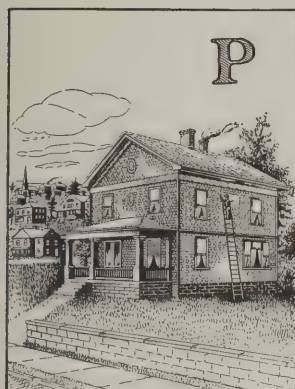
The annual exhibition of the work of the evening classes in Pratt Institute, Brooklyn, N. Y., was held on Monday evening, March 17. The exhibit afforded visitors an opportunity not only of viewing the work of the students in the various courses, but of inspecting the results, methods, equipment and general facilities of the school for conducting various branches of industrial training.

The annual convention of the National Building Trades Employers' Association of the United States will be held in Washington, D. C., March 26 and 27, with headquarters at the Continental Hotel, Union Station Plaza.

EXECUTING CONTRACTS ON A PERCENTAGE BASIS

Advantages of a System Which Protects the Contractor as Well as the Owner—Its Growing Popularity Among Builders

By G. D. CRAIN, JR.



PROBABLY the greatest benefit enjoyed by the builder who does good work—work which will stand not only the inspection of the architect or owner, but the much more searching examination of time—is the prestige which naturally attaches itself to his name. People come to speak of him as a leader in his line, and turn to him regularly when they

have work requiring expert services of that sort to be done.

While a record of dependable work and satisfied customers is of advantage in every line, and certainly so to the carpenter and builder, it is greatly reduced in this field because of the tendency, happily becoming less general, to let contracts only after competitive bidding. For some reason or other, probably because the owner realizes that he is not an expert and can easily be imposed upon, the demand for competition on a price basis only is put forward above every other consideration.

The man who would not think of buying his furniture in that way wants to contract for his house solely on a basis of comparative prices. The owner whose taste and desire for convenience and comfort, as well as quality and character of workmanship, guide him in the selection of his clothing, his food and the furnishings of his home and office, refuses to consider these essential features when it comes to building, and insists on giving his work to the man who can make the lowest bid.

That, at any rate, is the tendency, though, as suggested above, it is being successfully combated in a number of sections, where a better plan has come into use. It is the percentage system, and while it is frowned upon by some members of the trade, it has so many advantages that it is practically certain to come into more and more general favor.



The fact that good builders get contracts under the competitive system does not affect the truth of the statement that the danger that poor work will be done is always present. The lowest bidder

may cut the price to get the business and then cut the work to get a profit; or he may be willing to accept a smaller remuneration than others in the field think is proper. In the latter instance, the assumption may fairly be made that his work is worth no more than the valuation he puts upon it, and that the owner will get just about what he pays for in the way of a building.

One of the largest contractors and builders in the Ohio Valley, who specializes in high-grade dwellings, said recently that during 1912 he has handled over

\$100,000 worth of work of this kind on the percentage basis. The more owners hear of the plan, the more they like it, he said, and that it has advantages for the builder is also his belief.

"Suppose I have done a good piece of work for John Smith, the big property-owner," he explained. "The next time he gets in the market for something in my line, he will likely give me an opportunity to figure on the job. But if my bid happens to be a few hundred dollars higher than that of somebody else, on a piece of work involving thousands, he cannot bring himself to give me the contract and pocket an apparent loss of that amount. So, in spite of the fact that he wants to give me the job, because he has been impressed with the fact that my work is of a high quality, he turns it over to the lowest bidder. That is human nature.



"On the other hand, if Mr. Smith knows of the advantages of the percentage plan, the chances are that he will immediately put the proposition up to me. If we can arrive at an agreement as to what my gross profit on the work should be, I am authorized to go ahead.

"In this connection, that of fixing the proper percentage, I have had little difficulty. The amount varies from 10 to 20 per cent, depending on the class of work. On a small and comparatively cheap job, requiring more labor in proportion to the amount involved than others, the larger percentage is used, and less on the larger ones. It is a great system, according to my way of thinking."

One of the principal reasons for the increased popularity of the percentage system is the success of firms which have been organized to handle entire jobs of home-building, from drawing the plans to putting up the structure itself. This work is handled on a percentage basis, the plan undoubtedly growing out of the architects' custom of charging 5 per cent for drawing plans, letting contracts and supervising the construction. In many cases builders who undertake this work as well as the actual construction have found the percentage system to work just as well in the latter department as in the former.

It must be remembered, too, that a system of this kind is sure to stimulate the volume of building undertaken. This may sound like a strong statement, but its truth will be recognized when it is remembered that many people refrain from building homes because they have been told by their friends that it always costs more than they thought it was going to do. And then explanations of how much this "extra" cost, and how much more this involved than the original amount provided for, are forthcoming, with the result that the man who had notions of putting up a \$3000 or \$4000 residence decides to pay rent a while longer and not risk plunging in over his head.

This is an actual condition, and has deterred many a prospective home-builder from going ahead. It has gotten to be a popular impression, similar to those about the plumber and the iceman, that a building always costs more than its owner had intended, and hence the man with a moderate sum to invest hesitates to begin what appears to be a difficult and uncertain undertaking. And there are a lot of air-castles that never get down to real, solid earth, just for this reason.

This condition is remedied to a large extent by the percentage plan, for a limit is always fixed beyond which the builder may not go. And when there is added to this, as is frequently the case, a provision that the builder is to receive 50 per cent of the saving that is made on the original estimate, there is every incentive for him to reduce costs at every turn, and to put the building into the hands of the owner, complete, for less than had been expected, instead of more. This is the modern profit-sharing idea which has been found to work well in manufacturing and mercantile establishments, and there is no reason why it should not be a success in the construction field.

A well-known builder recently had a \$20,000 warehouse job, which had been taken on a 10 per cent basis, with the agreement that half the saving made should go to the contractor. The cost of labor and materials actually used turned out, by some careful management on the part of the builder, to be \$15,000. Ten per cent of this was \$1,500, making the total cost of the building \$16,500. This left \$3,500 to be divided between the owner and the contractor, giving the latter \$1,750, and making his earnings on the job \$3,250. He was more than pleased with his work, for he had made a handsome profit, which amounted to about 17 per cent of \$20,000; while the owner felt that he had gotten the building put up much more cheaply than if he had had competitive bids submitted, since the chances are that the architect's estimate of \$20,000 would have been close to what the contract would have been let at.

Cost of "Extras"

In the average dwelling proposition, the contractor who takes a job at a low figure cannot help trying to increase his profits to normal by putting in the inevitable extras at a pretty high figure. This is what most owners object to; namely, that the bids are not a fair indication of what the house is going to cost. When the percentage system is used, extras go in at no higher figures than any other items, and the tendency of the builder, especially if he is on a basis similar to that outlined above, whereby he as well as the owner will profit through securing a saving in the cost of the job, will be to reduce the expense attached to these, instead of increasing it.

The system is eminently fair to the contractor, since it rids each job of the terrors attached to figuring an unusual or unknown quantity. In most cases, especially where a building something out of the ordinary is to be put up, and unusual conditions must be confronted, it is necessary that the contractor add a considerable factor of safety, in order to be sure of making a profit. But in a case where the business is handled on the percentage basis, the contractor need have no fear of losing all of his profits because the cost of handling a new proposition was greater than it was figured at, but will put in the expense at exactly what it turned out to be. And while it protects the contractor, it protects the owner as well, since he does not have to pay the margin over actual cost that it included when "x," the unknown, has to be taken care of.

Convention of Canadian Builders Exchanges

One of the most important results of the seventh annual convention of the Canadian National Association of Builders Exchanges held in Calgary, February 18, 19 and 20, was the reorganization of the National body into closely affiliated Eastern and Western Associations. The Eastern Association will comprise the provinces east of Manitoba, while the Western will consist of the Builders Exchanges in British Columbia, Manitoba, Alberta and Saskatchewan.

Officers of the Western Association were elected for the ensuing year as follows:

President.....W. J. Davidson of Winnipeg.
First Vice-Pres......G. Sylvester of Calgary.
Second Vice-Pres....W. A. Wilson of Regina.
Sec.-Treas......A. M. Rose of Winnipeg.

The officials elected for the ensuing year for the Eastern Association were as follows:

President.....George Gander of Toronto.
First Vice-Pres......L. A. Martyn of London.
Second Vice-Pres...James Ballantyne of Montreal.
Sec.-Treas......P. L. Fraser of Toronto.

The officials of both the Eastern and Western Associations will constitute the executive body for the reorganized National Association.

One of the features of business at this meeting was the appointment of a special committee to examine into the causes of the labor shortage and to co-operate with various associations in bringing workers from Great Britain.

A resolution was passed recommending the enactment of a uniform building code in the four western provinces. Another requested architects to furnish contractors outside of the ordinary $\frac{1}{8}$ in. scale drawing, all necessary scale drawings to clearly show the work on which bids were to be invited, so that contractors might figure the work intelligently.

Not the least interesting feature of this convention were the reports presented on behalf of the various affiliated Builders Exchanges. These showed the important work which the bodies were doing and outlined conditions in the trade in the various cities.

Consumption of Front Brick in New York City

Approximate consumption figures for front brick in the Metropolitan district covering 1912 have been compiled and show a material gain over the figures for the three previous years, says a recent issue of the *Record and Guide*. For the Metropolitan district the total estimated consumption of front brick in 1912 was 103,000,000; in 1911 the consumption was figured at 95,660,000; in 1910 96,000,000 and in 1909, 98,000,000. The estimated total of enamel brick sold in this district in 1912 was approximately 5,000,000 as against the estimate of 4,000,000 last year. This is not inclusive of porcelain brick which is figured as front brick.

The total consumption of front brick exclusive of enamels in New York City during the last four years with values follow:

Year.	Consumption.	Value.
1912.....	87,000,000	\$2,436,000
1911.....	60,000,000	1,380,000
1910.....	70,800,000	1,699,200
1909.....	75,000,000	1,875,000

These values are based upon an average yearly price for all kinds of front brick sold in this market at \$28 a thousand (basic) as against a basic price of \$23 a thousand wholesale prevailing last year.

Vancouver, B. C., is to have new Young Men's Christian Association buildings costing with the site \$600,000. H. S. Griffith is the architect.

A movement is on foot by the Kansas State Architectural Association, looking to the passage of a bill requiring architects in that state to be licensed.

THE USE OF CASEMENT AND FRENCH WINDOWS

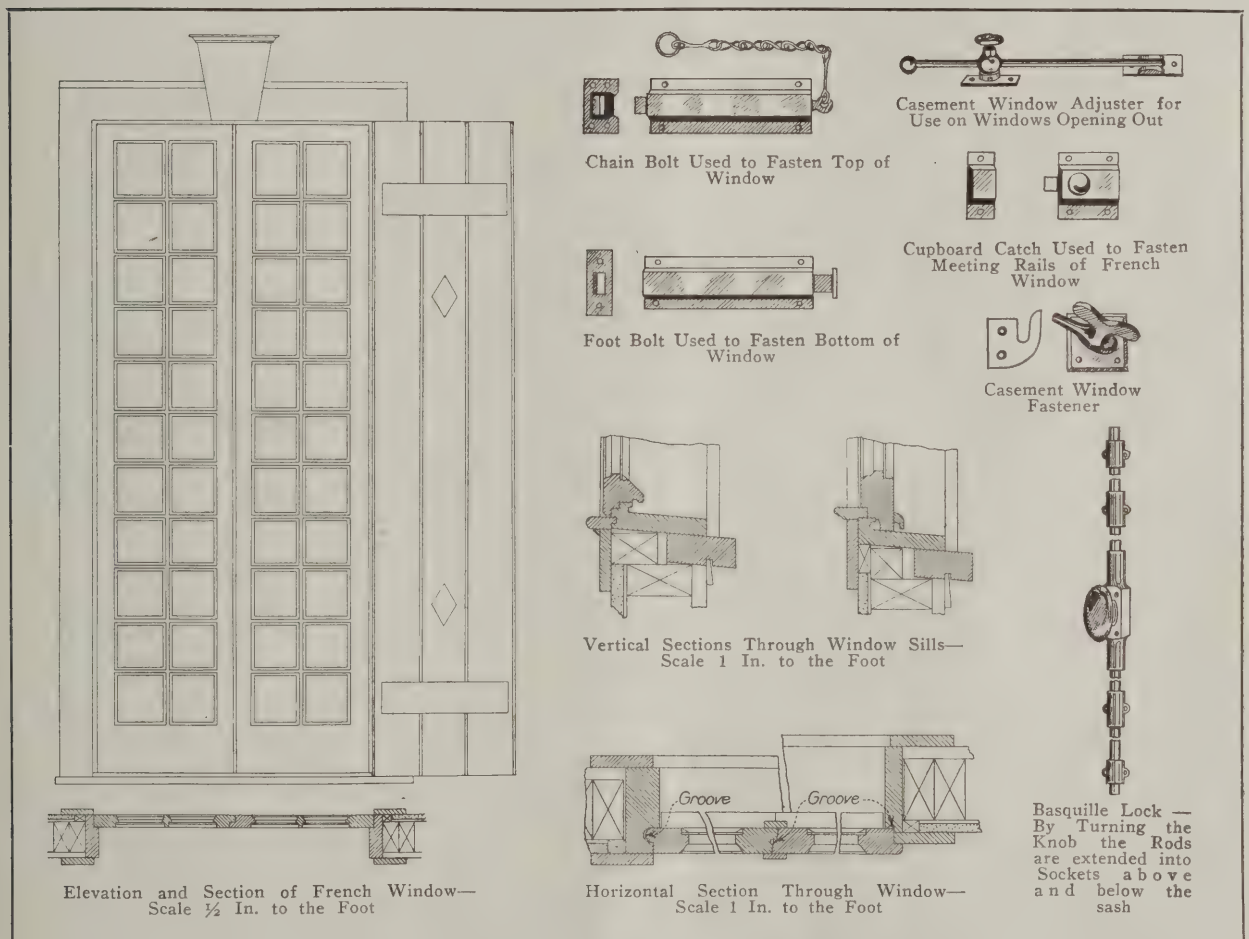
How to Render Them Storm-Proof—Methods of Fitting the Sash—Arrangement of Parts When the Windows Open Outward

BY CHARLES EVERETT ANDERSON

CASEMENT windows are extensively used in building construction in Europe but they are not so common in this country, although if properly made they are useful in certain places as well as ornamental. Casement sash can be used on low windows where checkrail sash could be opened only a few inches. In a dormer where the window may be only 2 or 3 ft. in high casement sash can be opened the full size of the window, whereas checkrail sash would give only half of the open space.

One of the objections which has been raised in some sections with respect to casement windows is the

details for the lower rail, both for a window swinging inward and one swinging outward. The French window shown has an opening 3 ft. by 7 ft. which is a stock door size, and requires merely a stock door frame. The windows can be made any size, although 3 ft. is a good width, while the height depends upon the location. Those for which the details here presented were drawn are 3 ft. high, with an opening 3 ft. wide. The bottom rail of the casement opening inward and having a projecting lip should be $2\frac{3}{4}$ in. deep by about $2\frac{1}{2}$ in. thick. The bottom rail on the casements opening outward should be $3\frac{3}{4}$ in. deep by



The Use of Casement and French Windows—Some Details of Construction and Equipment

difficulty encountered in making them storm-proof, especially if they open inward. The only way to overcome this defect is to make sure that the wood used has shrunk to its limit before constructing the window. Casement windows are usually tight when made, but after a short time has elapsed the shrinking of the wood tends to open up the meeting rails and leaves openings at the top and bottom of the window, admitting drafts of air and the rain if there be a driving storm. The wood used in mill work is not always sufficiently dry to prevent these defects and special drying would seem to be the only thing to suggest as a remedy for leaky casements.

The drawings presented herewith relate to details of two methods of fitting sash which swing inward, also

$1\frac{3}{8}$ in. thick. The top rails, meeting rails and hanging stiles of the casement should be $2\frac{3}{4}$ in. wide by $1\frac{3}{8}$ in. thick. French windows are made a little heavier, the material used being $1\frac{3}{4}$ in. thick. Since they are not tongued into or lapped over the jambs the rails and stiles need not be so wide. The hanging stiles and meeting rails may be $2\frac{1}{4}$ in. wide, the top rail $2\frac{3}{4}$ in. and the bottom rail $8\frac{1}{4}$ in. wide to prevent sagging.

Capillary action or the tendency of water to work itself between two closely adjacent surfaces should be guarded against by grooves as indicated in the various sections. These grooves are also useful in preventing the water beating in under wind pressure, since the wind coming through a small crack be-

tween the sash and the jamb and then into the larger space caused by the grooves, loses some of its force, just as the current of a river slackens at a point where the banks are wider apart. A throat or groove should be provided especially in the lower rail. The sill should be well pitched and rabbeted for the sash. The stiles are sometimes tongued into the jambs, as shown in one of the details, a groove being left between the tongue and jamb. Where the windows open inward the lower rail should project well outside of the jamb and should be grooved to prevent the water from running under.

Where the window is to open outward the problem is somewhat similar, the rail and sill being grooved and throated and a grooved molding being placed on the outside of the sash with the groove underneath to keep the drip away from the bottom of the sash. The meeting rails should be beveled and rabbeted, a groove being placed at the center of one meeting rail to permit any water to run off which might work its way in.

If casements are made with a single sash instead of with two, they should be made to swing inward since it is almost impossible to get at the outside of a single casement to wash it if it be located at the second story. Double casement sash are not open to this objection.

French windows, so-called, which are really doors, are usually in a more or less protected location, generally opening on a porch protected by the porch roof. In such a case it is not necessary to take any more precautions than with an ordinary door and the jambs are usually detailed in the same manner as ordinary door frames. If they are to be placed in a more exposed position they should be detailed in the same manner as the casement windows.

French windows and casement windows if properly designed and used add remarkably to the appearance of a cottage. It is customary to detail them with small lights, and in fact their appearance is greatly improved by keeping the lights small. The French window shown in the drawing has lights approximately six inches square. The appearance is improved if the panes are slightly higher than they are wide. In the case of a cottage, for instance, the French windows on the lower floor open into the living room and give more light than would the ordinary window, as well as adding an air of distinction to the cottage. The upstairs casements are three feet high and can be opened so as to give the full benefit of the entire window space, whereas checkrail windows could be opened only eighteen inches.

These windows can be fitted with fixtures which will permit of their being fastened open any distance if they open outward. They are usually fitted with foot bolts and cupboard locks, and are fastened at the top with a spring bolt to which a chain is attached, by pulling which the bolt can be unfastened. Sometimes a bas-quille lock is used. This consists of a knob or turn-screw at the center of the meeting rails with a bar running to the top and bottom of the sash. When the knob is turned the rods push upward and downward into eyelets in the casing, fastening the window.

In the accompanying illustrations are shown some of the hardware used in connection with casement windows.

Benefits of Industrial Education

The subject indicated by the above title is one of never-ending interest at the present day, and what follows are extracts from the speech of A. C. Ochs, on Industrial Education, at the banquet given in connection with the February meeting of the Northwestern Clay Association, at Minneapolis, Minn.:

Every thoughtful man must admit that something

must be done for our youth who wishes to learn a trade.

The world has never seen a time when this was more essential than at present because of the restrictions put upon the apprenticeship by all trade unions—especially so, by the bricklayers' unions. The situation has become so acute that we, who are dependent on the men that will place our material into the wall, are lying awake at night trying to solve the problem.

Our public schools have taken up manual training and in many of our country and city schools there has been a creditable showing made along the lines of wood-working, mechanical and other trades but thus far little or nothing has been accomplished in the art of bricklaying. This is not to be wondered at. It is doubtful whether very much can be done along these lines in our public schools since it would be quite difficult to handle the material in so small a place as the basement of the school. But the public school can do a great deal to further the building trades by teaching architectural drawing, etc., and thereby interesting the boys in the art of bricklaying. The teachers of the schools might also take the students to places where buildings are being erected and interest them in the practical work.

A short time ago I spoke on "The Building of Clay Block Silos" to a class of short course students at the experiment station of the State Agricultural School. There were about 150 young farmers listening with interest to my explanation of how a silo should be built, and after the class was dismissed my time was occupied for fully two hours in further explanation to interested students.

During the last summer we built a silo on the experiment farm of this State. Before the silo was erected I asked Professor Mayne whether he would not take the students daily to where the silo was being built. This he did, and we showed the students how the walls were laid up and how the reinforcing was placed. I think that most of these young men are able to build their own silos. We now have several young farmers who will erect their own silos, and I know that the work will be fully as good as if a bricklayer had put them up, because it will be for their own use.

Meeting of North Carolina Builders Exchanges

Discussion of the reports of the various committees appointed at the meeting held at Wrightsville Beach last summer; discussion of a bill to be introduced in the Legislature providing for uniform lien laws for the state; the election of officers; the discussion of the proposed lien law by Judge Manning, and the decision to affiliate with the National Association of Builders Exchanges, were features of the sixth annual winter meeting of the North Carolina Builders Exchange recently held in Raleigh, N. C.

The election of officers resulted in the following choice:

President.....H. A. Pfohl
Vice-President.....J. F. Underwood
Sec.-Treas......E. P. Tingley of Charlotte

Following the election of officers a vote of thanks was tendered to the retiring officials of the Exchange for the excellent manner in which they had served the Association.

The members closed the sixth annual meeting with a sumptuous banquet at the Yarrowborough, when covers were laid for more than 60 members and guests.

President Pfohl acted as toastmaster, and among the speakers were the retiring president, J. A. Jones of Charlotte; N. Underwood of Durham, a former president of the Association, together with various members of the general assembly.

COMMENTS ON "QUARTER" AND "RIFT" SAWED LUMBER

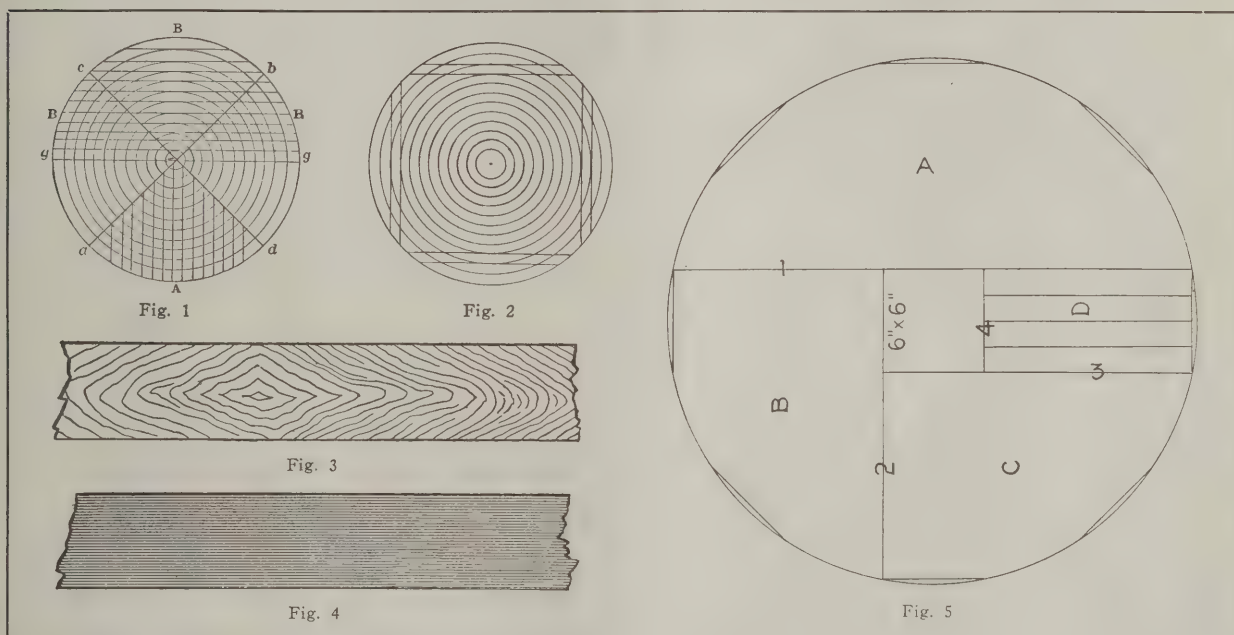
Illustrations Showing What Is Meant by the Different Terms
As Commonly Used in the Trade

At intervals in the past there has come up for discussion the difference, if any, between "quarter-sawed" lumber and that which is often designated as "rift sawed." The point has been made that if the two terms are synonymous, what is it called when hardwood is sawed so as to show the figure; that is, to quarter the log and then saw from the center out. A further question has been, do the terms "quarter," "rift" and "edge grain" all mean the same thing. In discussing these questions in one of its issues not long since, the Northwestern Lumberman presented some very interesting comments with diagrams illustrating what was meant by the terms enumerated, and as being of interest to readers of *The Building Age* we present the following extracts:

The terms "quarter," "rift" and "edge grain" all

while the fourth one from it toward the outside will be just about half rift and half bastard. Supposing the lower quarter, *A*, to be cut out from the log, the common and most simple method of quarter sawing is to make the cuts as shown by the straight lines which cross the concentric rings at sufficiently near right angles for making good flooring. Each piece, however, will have a beveled edge as shown, which must, of course, be squared by the edger. Special arrangement of mill carriage and head blocks are in use for rift sawing when great accuracy is desired.

The common method of bastard sawing is illustrated in Fig. 2. It simply consists of so turning the log upon the carriage as to expose the grain as much as possible. The diagram only shows cuts that would make an ordinary cant of the piece, but the judgment



Comments on "Quarter" and "Rift" Sawed Lumber—Various Methods Illustrated

mean practically the same thing, though there are different methods of cutting the lumber. When the lumber is cut so as to show the figure it is termed "bastard sawed," though the common method of securing this class of lumber is not to quarter the log and saw from the center out. To secure the minimum of shrinkage or warp, a board must be rift sawed, which means cutting the medullary rays at right angles with the circles of growth. Quartered oak is simply rift sawed, the designation "quartered" arising from the method of first cutting the log into quarters and then cutting the quarters, as shown in Fig. 1 of the following diagram. The lines *a b c d* are those upon which the log is supposed to be quartered; the circles represent the concentric rings of the tree's growth. The straight lines across the upper half of the log, *B-B-B*, show the ordinary method of slicing it up into boards with a circular or gang. Wherever the cut of the saw crosses the circles at right angles, or nearly so, that much of the board is rift sawed; when it runs nearly parallel with them it exposes the grain, and is what is rather inelegantly termed bastard. The board nearest the middle, *g g*, will be almost a perfectly rift-cut piece,

of the sawyer must be exercised to so turn the log as will make its form square, octagon or hexagon, as may be best to expose instead of cut across the grain, and allow its curve to show in the center of the board. Both of these methods of sawing, as will be seen, are wasteful to the timber, but that can not well be avoided. Judicious bastard sawing in certain kinds of wood, such as oak or ash, develops some very beautiful grain effects, and for ornamental finishing purposes enhances the value of the wood to as great or even a greater degree than by rift sawing it, as the latter is mainly required where the stuff is to withstand continuous wear, as in the case of flooring, or is to fill a place where it must neither shrink nor warp, as in the case of sounding or reed boards in musical instruments. The appearance of pieces of lumber cut rift and bastard may be seen in Figs. 3 and 4. If laid in a floor Fig. 3 will wear rapidly and unevenly, and always have a tendency to sliver, while Fig. 4, having the ends of the grain exposed, will greatly outlast it, wear more evenly and present a much better appearance. As the panel to a desk or a piece of furniture, Fig. 3, is considered by many as much handsomer than the other.

The methods of quarter sawing adopted and championed by experienced sawyers are numerous, but the following are some of the most approved plans. It should be remembered that the variety of timber and also the purpose for which the product is to be used, determines what is and what is not practical and practicable quarter sawing. In oak and similar woods, where it is desired to show as much as possible the typical figure produced by quarter sawing, the line of sawing should be almost directly between the heart and the outside of the log. The same is necessary where the purpose is to avoid warping, as in materials for wide panels, table tops, etc. The difficulty in this

genuine quarter sawing is in process of execution.

One of the most popular methods of rift sawing in hardwoods is as follows: Halve the log, put one-half back on the log deck, place the other with the half round on the carriage and against the knees, with the sawed surface sloping down from the top of the knees toward the saw at an angle of 45 degrees. Cut off boards until the heart is reached, then turn down the side against the knees until the last surface cut is at an angle of 45 degrees, and cut as before. Turn down again, in the same direction, another eighth turn, and repeat. Thus each half of the log takes four positions. This method requires for its most convenient applica-

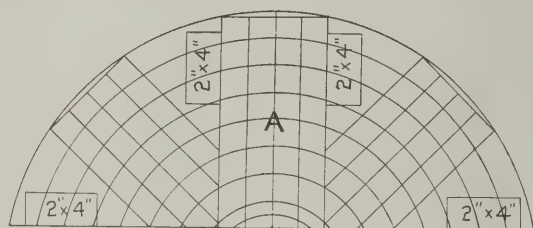


Fig. 6

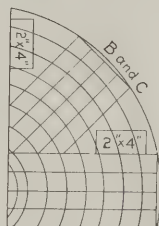


Fig. 7

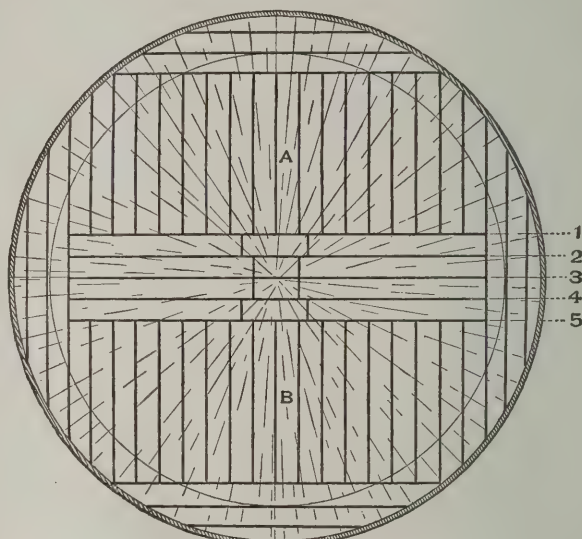


Fig. 8

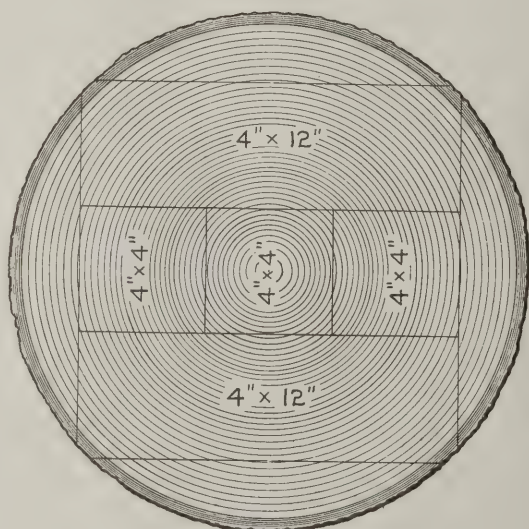


Fig. 9

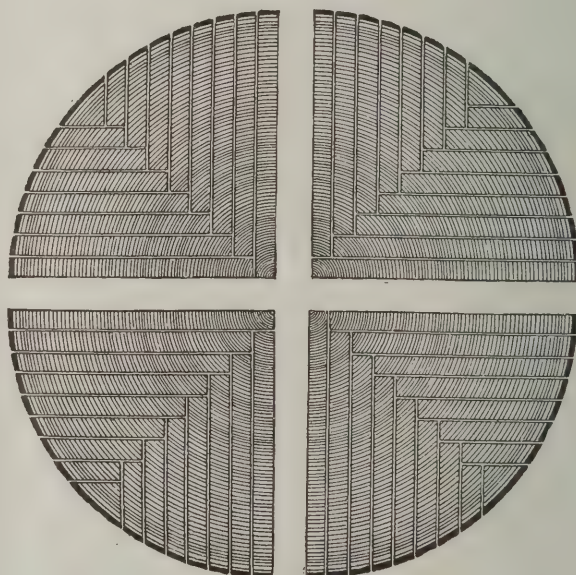


Fig. 10

Comments on "Quarter" and "Rift" Sawed Lumber—Various Sawings Illustrated

method of cutting is that almost every piece has a beveled edge, and has to be run through an edger. The product is also of all widths.

Where, however, mere resistance to wear is required, without regard to beauty of grain, and also where the piece is to be securely fastened in place, much less attention need be paid to an exact rift sawing. In flooring, for example, it is sufficient if the annular layers of growth be cut across at an angle of say 45 degrees, or even less. Thus the cant need be turned much less frequently on the carriage than when

tion an under dog, but good work is often done by the careful use of a wedge under the log. In this method the whole log is reduced to lumber which is all pretty close to the true rift sawed, but the waste in edging is great.

In the method illustrated in Figs. 5, 6 and 7, the whole contents of the log are more nearly utilized. The larger diagram shows the preliminary work. The two smaller ones show how the different parts are to be treated. The different steps are as follows: First take off eight slabs, reducing the log to an octagon.

Second, cut on the lines 1, 2, 3 and 4, in the order given, leaving a heart piece which may be 6 x 6, as shown in the first diagram, or 4 x 4. Third, cut the piece *D*, as shown. Fourth, cut the piece *A*, as shown in the second diagram. This piece, somewhat less than one-half the log, requires three turnings. Fifth, saw the parts *B* and *C*, which are alike in size and shape, as indicated by the lines in Fig. 7. It will be observed that the wedge-shaped pieces may be converted into 2 x 4 or larger.

Too little attention has been paid to quarter sawing flooring, but as an exact quartering is not necessary, the process is comparatively simple and inexpensive. For this purpose the method illustrated in the engraving Fig. 8 may be recommended. First, square the log, 8-in. face heart. Then saw the lines 1, 2, 3, 4 and 5, after which rip up the cants *A* and *B* together. This plan is particularly adapted to gang mills. All the lumber inside the circle indicating the heart wood is near enough the true quarter sawing for flooring.

A modification of this design is shown in Fig. 9, the only difference being that a square piece is left inclosing the heart. Either of the methods outlined in Figs. 8 and 9 is, as stated above, especially adapted to mills using gangs. If two gangs are in use, part of the saws can be taken out of one of them, leaving the blades at the center and sides of the frame to cut in Fig. 8 the numbered lines and those parallel to them. Then the cants *A* and *B* may be sent to the second gang to be ripped up together. In mills where there is no gang, the two last cants produced by either method may be placed on the carriage, the one on top of the other, and sawed together.

The process of rift sawing is greatly simplified, and a saving effected of both time and material, through the use of special machinery designed for the purpose. The manner in which the work is done by a rift sawing machine is shown in Fig. 10. To prepare the log for the rift machine it is put on an ordinary saw carriage, one side skinned, then turned down and halved, not allowing the saw to come entirely through the log. Then it is turned, another side skinned and the log quartered, thus requiring only four cuts by the circular before it comes to the rift machine, and no slabs have been taken off. The rift machine has two operators, one at either end. The first operator takes a quarter of the log, places it on the half of the table nearest him and starts it through the machine, sawing a board. The second operator, standing at the other end, gives the quarter from which the board has been sawed a quarter turn and returns it by the oppositely driven saw, cutting another board at right angles to the first one sawed. This method is continued, the quarter going back and forth until it is entirely cut up. As each side of the machine is cutting all the time, its capacity is very large, and, as will be seen from the diagram, the waste of material is reduced to a minimum.

How to Drive Nails

Some rather humorous comments dealing with the above subject appeared in a recent issue of *Ideal Power*, and we give space to them herewith:

"Select a good healthy nail, straight, sharp, with a good head, and if possible one that has never been driven before. Grasp it firmly by the spinal column with the thumb and forefinger of the left hand; its point away from you, its head towards you.

"Next select a place to drive it. This should not be difficult, as there are many loose, scattering, wobbly places in this world that need nails and into which no nail has ever been driven.

"Next find a hammer, or a stone, or a hair brush with which to drive it. A hammer is preferred, be-

cause most people know how to use one and it can frequently be found when required.

"Do not sneer, do not laugh.

"Many people drive nails in just this way and carry their fingers in slings most of the time. Some people, while fortunate in their selection of nails, can find no place to drive them, or when they do find a place, can find no hammer with which to make the drive. Others have good nails, have excellent places to drive them, have good hammers—but when they strike they do not hit the nail on the head. The results are the same in these cases—failure.

"Many a bright, shiny nail, shapely, pointed, straight and with a good head lies unnoticed in the workshop, or is lost in the crevices of the busy artisan's work bench. Many are the loose boards with gaping ends and creaky joints that might become useful and diverted to noble purposes could they be brought together with a good nail. Many are the hammers lying in convenient places, inviting willing hands to take them up and use them.

"For the nail is the happy thought which, when driven home, becomes a deed worth while. The loose boards are the opportunities lying fallow until restored to usefulness by the nail, and the hammer is the vim, the persistent energy with which anything must be struck if it is to be driven home."

Timber Cutting and the Moon's Phases

During the last few months newspapers have revived the well-worn tale that wood cut during the crescent of the moon does not last as long as that felled during the wane, and especially from the last quarter to two or three days before the new moon. It is believed by many that timber felled after the new moon and until after the full of the moon, splits more freely and does not possess the durability of timber cut at another time, says a recent issue of the *Hardwood Record*. A good many farmers are still influenced by this belief and pay special attention to the phases of the moon when they wish to prepare fence posts or structural timbers which are to be placed in contact with the soil. They consider that fence posts cut during the wane of the moon preserve all their best qualities.

While it is well known that timber cut in spring and summer is not as durable as that cut in winter, when the life processes of the trees are less active, no one has yet been able to produce a scientific explanation in support of the popular opinion that the phases of the moon exercise a marked influence on the durability of the wood cut at different periods.

It was also considered that this influence of the moon is much stronger in the tropics than it is in the temperate zones, but as a result of experiments conducted on the island of Trinidad, just off the coast of Venezuela in South America, a few years ago the theory was finally rejected as having no foundation of fact.

While this opinion respecting the influence of the moon on the quality of the felled timber has already been the subject of much and varied discussion, it has never appeared reasonable enough to the intelligent wood users in this country to induce them to conduct a careful experiment. It is evident that if this matter were not free from doubt the railroads in this country, which use over a hundred million crossties annually, would look into it very critically. It is, however, certain that no such lunar influence exists and that the proposal to fell a tree during a certain quarter of the moon as a panacea against decay is entirely chimerical.

The dwarf-like Spanish houses of the flat roof and courtyard type in Buenos Aires are gradually making way for imposing edifices of architectural beauty.

SOME BRIEF COMMENTS ON GOTHIC DOORS

Early Development of the Idea—Important Part Played by Moldings—
A Few Practical Examples of Early English Gothic Doorways

BY JOHN Y. DUNLOP

THE first step in the building of Gothic doors was taken by the Romanesque architects when the idea was developed of constructing arches in thick walls not only one within the other but also in planes recessed back from the face of the wall. The next step was the addition of some simple moldings to the angles of the jamb and arch or series of arches such as a bead or a chamfer. Moldings played a very important part in these openings and from the first to the last they varied so constantly that their profiles and grouping may be constantly used as a kind of architectural calendar to point out the time to within a few years when the building in which they occur was erected. The molding was the means of drawing a line on the building and was also used to add richness and play of light and shade to the sides of an important arch. Moldings throughout the style differed in both size and profile according to the date at which they were executed.

In the twelfth century those separate receding arches were very common, but in the more recent arches the moldings have become so numerous and elaborate as to render it often difficult to detect the division in distinct planes which still exist. The passion for elaborate moldings, the most of which are extraordinarily under-cut, reached its height in the thirteenth century and it is found that in work of a more recent date those moldings became more simple.

In each period these doors were distinct in design from all that went before or came after and thus to trace the spirit of any Gothic period it is necessary to fix the shape of the arch, the proportion of the jamb, the features of the moldings and every ornament which is wrought in the true spirit of the work.

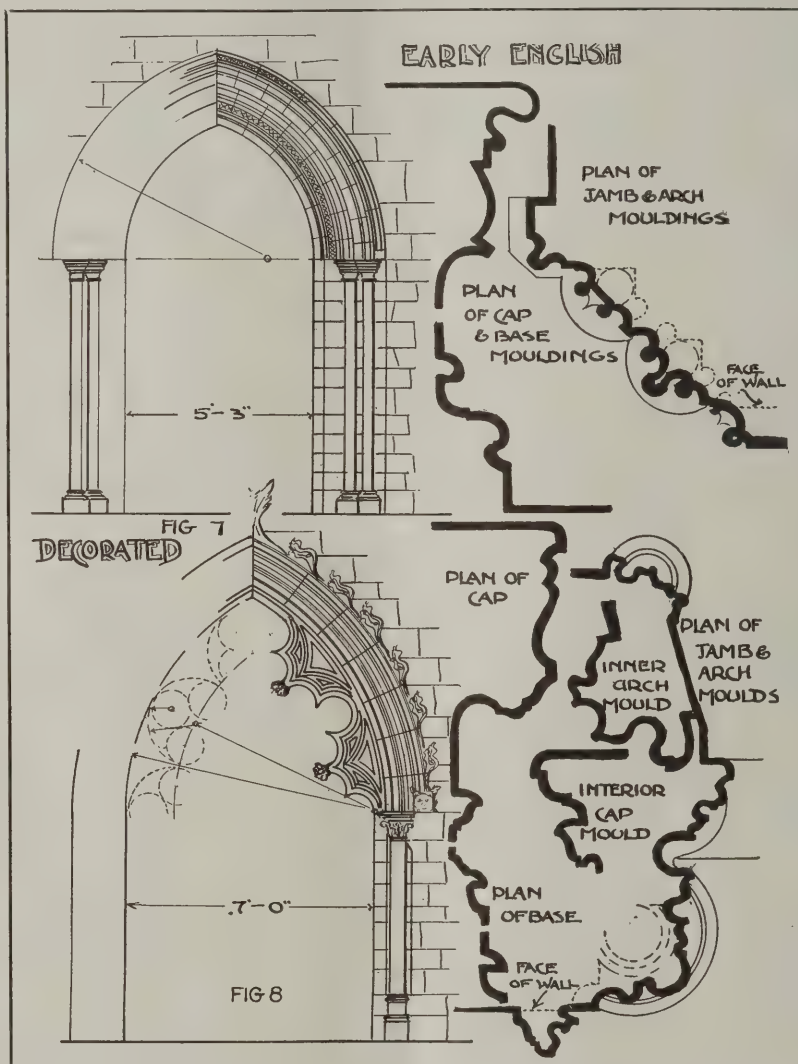
The doorways of the general early English are sur-

mounted by an equilateral or wide lancet arch with moldings, but instances have occurred of a semi-circular arch and a trefoil arch as shown in Fig. 1 of the pictures, which represents St. Minians Church at Glasgow. This is one of the earliest of the churches in that city, which was neither large nor ambitious.

Fig. 7 shows the geometry of a Gothic arch, the

moldings of which are deep, under-cut hollows and rounds with no foliage. Fig. 2 illustrates a very fine example of this type taken from Dunblane Cathedral. This is the west doorway, which is broad and deep, with large bold moldings which exhibit some remnants of the dog-toothed decoration of the Norman period. On either side of the pointed arch of the doorway there is a narrow arch of the same character faced with stone which contains a second arch.

In Fig. 3 is illustrated several doors in the main façade of the Coats Memorial Church at Paisley. The doors here are also very elaborate and the doorway is recessed far back and built with trefoil arches.



Some Brief Comments on Gothic Doors—Figs. 7 and 8—Geometry of the Work

The moldings and carvings are beautiful and the clusters of stalks show a somewhat conventional kind of foliage very luxuriant in its apparent growth.

Fig. 4 shows one of the principal churches in Leamington, Warwickshire. This is a typical example of decorated English with engaging shafts; arch struck approximately from the points of an equilateral triangle, crockets of flowing foliage on the outline of the arch and the moldings arranged on the wall soffit and chamfer plane.

The geometry of the doorway St. John Cley, Norfolk, is shown in Fig. 8 with the moldings of the jamb and soffit.

Fig. 5 shows the lower part of the west front of



FIG 1



FIG 2



FIG 5



FIG 3

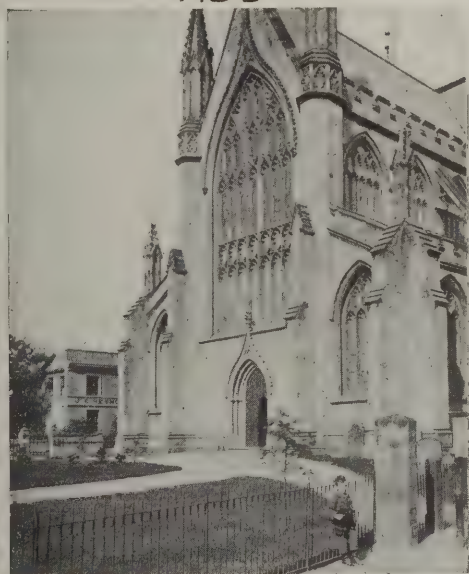


FIG 4



FIG 6

Some Brief Comments on Gothic Doors—Various Examples of Early English Construction

Letchfield Cathedral which was partially rebuilt from a design by Sir Christopher Wren. The side doors are equilateral Gothic and the elaborate moldings are beautifully ornamented.

The central doorway is a multiple foiled arch in which ornaments abound and include not only enrichment in the shape of carved foliage and statuary, but such ornamental features as canopies. The Gothic architects made good use of this sculpture work, for in all their best efforts statues abound, and for beauty and accessibility I can recommend no better example than the carvings and statuary which enrich the west front of this cathedral.

Another feature of the central doorway is the hinges of the oak doors, which are elaborately wrought in scroll work spread over the outer face of the finishing.

The Lime Finish on Plaster

BY PLASTERER

Reports from the country districts show that the use of plaster is extending out among country people in localities where heretofore it was hardly used at all. Down in the south country where lots of ceiling was formerly used they are now using plastering in great quantities and find that it gives much better satisfaction.

From there and from everywhere nearly, however, there comes complaint about the lime finish on plaster, of pitting and powdering off from the face. Sometimes this is accomplished by one unique explanation and sometimes by another, but there is really a plain, simple, straightforward explanation of it all.

The explanation of it is lack of thorough hydration of the lime before the finish is applied. The plasterer gets in a hurry and delays slaking his lime and fails to give it time enough for every particle to thoroughly slake, then when he applies this lime finishing coat and it dries out, here and there fine particles of lime that have not yet taken up their share of moisture absorb moisture either from the wall behind them or from the atmosphere and swell, thus causing pitting and what in the wood working world would be called "powder post."

In other words, there will be powder of lime dusting around the floors. Sometimes examination will show noticeable pitting in the walls and at other times the pitting is so fine that it is not noticeable to the naked eye, but we see the results of it in the powder and lime around on the floors.

This is a matter that does not merely concern the plasterer, it concerns the reputation of the contractor and builder and should be looked after. We have made a wonderful improvement in the body of our plastering work in the past decade, so that the plastered wall today is much superior to the old plastered wall, and for that matter the finish is often better too, but it is not as good as it could be made by proper care.

We have reached the day of critical finish. The discriminating public wants a plastered wall that will stand tinting or painting and not have to be covered over with paper to get a nice appearance. They may want to paper them, but not always, and a man likes to exercise his preference in such a matter anyway and not be compelled to paper over a wall to hide defects in the lime finish of the plaster.

It therefore behooves the contractor to have a session with his plasterer and see that he makes a strong point of quality in this lime finish, not only to get a clean white lime that will give a good finish—in fact, that is really a secondary consideration, as the color is usually a matter that is altered by tinting anyway—but what is wanted is a lime finish that will stay on and not be pitting or powdering off for months after

the walls are finished. There may naturally be a little of lime dusting off for the first few days after the walls have hardened, but a properly handled lime finish should stick well enough to a plastered wall that it will not be pitting and powdering off for the next six months or more.

It seems to be a matter of letting the lime and water set longer in the mortar box to insure thorough hydration of every particle of lime. In some instances it may be a matter of getting a better lime, a lime more thoroughly burned or a lime from a different kind of stone, but what it looks like generally is just a matter of a little more time and pains to slaking in the mortar box. If this is the remedy it is up to the contractor to see that it is applied, for both his reputation and the welfare of the plastered wall in the future depend considerably on getting the highest degree of satisfaction in the work.

Wages in the Building Trades for 1913

The following schedule covering the prevailing rate of wages has been issued by the United Board of Business Agents of the Building Trades of Manhattan, New York and Vicinity. The schedule is based on eight hours' work per day from 8 A. M. to 5 P. M., except on Saturday, when work in the building trades ceases at noon.

Asbestos workers, boiler felters, pipe coverers, insulators.....	\$4.75
Asbestos workers' helpers.....	3.00
Blue stone cutters' helpers.....	3.00
Blue stone cutters, flaggers, bridge and curb setters.....	4.50
Boilermakers and iron shipbuilders.....	5.00
Boilermakers' helpers.....	3.50
Bricklayers.....	5.60
Bricklayers' helpers.....	3.00
Carpenters and framers.....	5.00
Cabinetmakers.....	5.00
Cement and concrete masons.....	5.00
Cement, concrete and asphalt laborers.....	3.00
Derrickmen and riggers.....	4.00
Decorators and gilders.....	4.50
Decorative art glass workers.....	5.00
Elevator constructors.....	5.28
Elevator constructors' helpers.....	3.40
Electrical workers.....	4.50
Electricians' helpers.....	2.20
Electrical fixture workers.....	4.50
Engineers, stationary.....	4.50
Engineers, portable hoisting, etc., \$30.25 weekly.....	By the day 6.00
Framers.....	5.00
Granite cutters.....	\$4.50 yard....
House shorers, movers and sheath pilers.....	Bridge 3.75
House shorers' helpers.....	2.65
Housesmiths and bridgemen.....	5.00
Ironworkers.....	5.00
Ironworkers' helpers.....	3.50
Ironworkers' apprentices.....	3.00
Metallic lathers.....	5.00
Marble cutters and setters.....	\$5.00....After March 1st, 1913, 5.50
Marble carvers.....	\$5.50....After March 1st, 1913, 6.00
*Marble polishers.....	4.00
*Marble sawyers.....	4.25
*Marble bed rubbers.....	4.50
Marble cutters' helpers.....	\$3.00....After March 1st, 1913, 3.25
Mosaic workers.....	4.50
Mosaic workers' helpers.....	3.00
Machine stone workers.....	4.00
Machinists of all descriptions.....	5.00
Paper hangers.....	Price list
Plate and sheet glass glaziers.....	3.50
Plasterers, plain and ornamental.....	5.50
Plasterer modelers.....	\$30.00 to \$100.00 weekly
Plasterers' laborers.....	3.25
Plumbers and gasfitters.....	5.50
Painters.....	4.00
Painter-decorators, painter-strippers, painter-gilders.....	4.50
Painter-letterers, painter-grainers, painter-varnishers.....	4.50
Riggers on machinery, dynamos, boilers, etc.....	4.00
Roofers, tar, felt, composition, damp and waterproofers.....	4.00
Rockmen.....	2.50
Rock drillers and tool sharpeners, open work, \$3.68....	tunnel 3.75
Sheet metal workers, copper-smiths, tinsmiths, metal roofers.....	4.75
Slate and tile roofers.....	5.00
Steam, hot water and general pipe fitters.....	5.50
Steamfitters' helpers.....	3.00
Tilelayers.....	5.50
Tilelayers' helpers.....	\$3.00....After July 1st, 1913, 3.25
Tunnel and subway constructors.....	3.75
Upholsterers of all descriptions.....	4.50
Varnishers.....	4.00
Wood lathers on new work, \$3.50 per M.....	Overhauling jobs 5.00

*Subject to change.

Compensation for a practical foreman ranges from 50 cents to \$1 per day over and above the schedule here given.

All recognized legal holidays and Sundays are figured at "double time."

ECONOMICAL DETAILING OF MILL WORK

Some of the Things to Be Avoided in Designing Details—
Turning Out Various Kinds of Inside Trim

WITHOUT question one of the most important things about mill work at the present day is the correct and economical detailing of the work to be made. So much of it is special material specified by architects that the stock patterns of the mill cannot be used, thus rendering it necessary to employ details furnished by the architect if he has made any or to detail the work in case this essential part has been omitted, as is very often the case, says Charles Cloukey, writing in a late issue of the *Woodworker*. It is not always a bad thing for the mill that the architect fails to furnish

if it is not too crooked, but to get a full 6-in. head casing requires an 8-in. board. If the lumber to be used is quarter-sawed, it is liable to be badly curved edge-wise in the drying, and so show a great deal more waste in getting out long stuff than the flat-grained lumber.

Perhaps the function of details is as important in getting out the stock or cutting as it is in finishing or putting the work together, but the value of details in this respect depends largely upon the way the cutting bills are made, and the means furnished the yard man

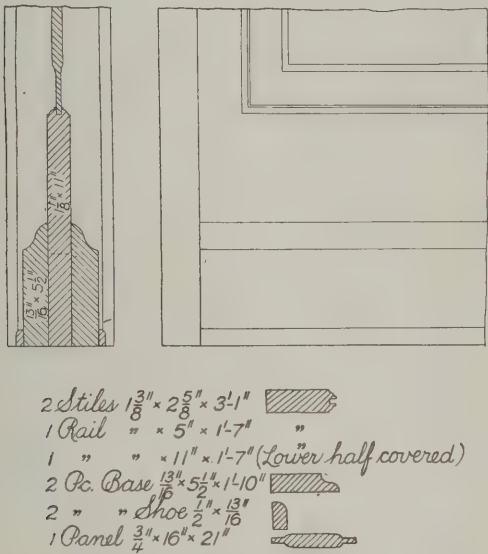


Fig. 1—Showing Just What Is Expected of the Material That is Billed Out

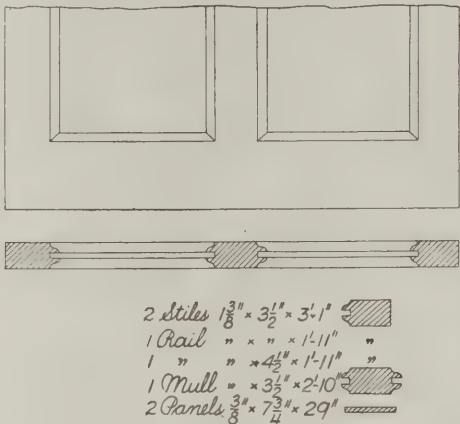


Fig. 2—Cross Section and Partial Elevation of Cupboard Door

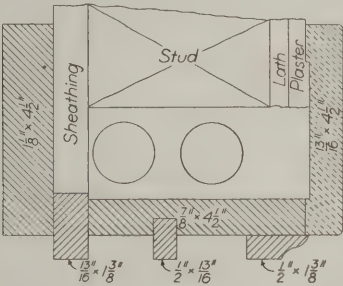


Fig. 4—Horizontal Section Through Window Frame Showing Weight Pocket

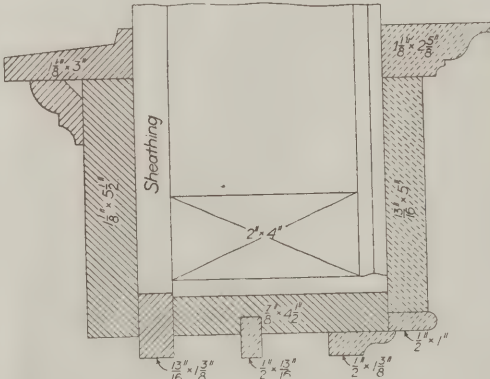


Fig. 3—Horizontal Section Through Window Head, Showing Style of Trim

Economical Detailing of Mill Work

full sized or even scale details, for it is frequently the case that the factory draftsman is able to make up a set of details which looks as well or better than the designs of the architect and at the same time costs much less on account of the millman knowing what he has in both knives and lumber.

One of the things to be avoided in designing details is the expense of making molder and shaper knives, unless it is absolutely necessary, for this is one of the acute expenses of the custom or odd work shop. Another thing to be kept in mind in designing and detailing is to keep within the standard sizes of the lumber required in the work. Avoid even widths in inches as much as possible, except in the hardwoods, where it generally takes about an inch in width to straighten up the stock for long jambs, casings, baseboards and the like. One can get a 5 1/4-in. jamb out of a 6-in. board

and the cutter to identify the items and to show the extent to which defects in the lumber may be used.

It is surely flying in the face of Providence nowadays to bill out so many pieces so thick, so wide and so long without any qualifying remarks, unless the stuff has to be absolutely clear. And when specifying the grade from which the pieces are to be cut it is well to add any pertinent information which the bill will carry without becoming confused.

Fig. 1 is intended to illustrate a class of details which show both the yard man and the cutter, as well as all subsequent workmen, just what is expected of the material billed out. It shows that the bottom rail of this panel work is covered on both sides at the bottom for half of its width, but that the top half must be clear on both sides. It shows that two pieces of base may have defects on one side which will not work out in the

ogee at the top, and that a small defect on the face side at the bottom edge will be covered by the shoe at the floor. It shows that the panel frame has a solid sticking, and therefore must be clear on the face edges, and that the panel shows both sides and is raised on both sides. The sketches in the bill serve to identify each piece as a constituent part of the panel work shown, and any workman of a little experience will soon see the significance of using just as poor lumber as he is able instead of the best he can find.

Of course, I am not saying that the yard man and cutter should both spend valuable time in trying to see just how mean stuff they can work into a good job, but the point is that they might spend valuable time in trying to find clear stuff to make the 11-in. bottom rails when the proper stuff lay ready to their hands if they only knew that half of it was to be covered.

I have had very proper stuff sent back to the mill by the owner of a fine residence because he did not understand that the defects in the pieces were to be covered by other members of the finish. The same pieces were sent out the second time, when the owner was out, and he never saw the defects in them again.

In Fig. 2 is shown a cross section and partial elevation of a cupboard door with the piece bill below. Generally speaking, it is not necessary to detail this class of work in the mill, as the men become accustomed to a shop style, and it is only necessary to mention if the work is for paint or for oil finish, and the style of sticking required. If the style is special and the sticking of a detailed pattern, then a drawing something like

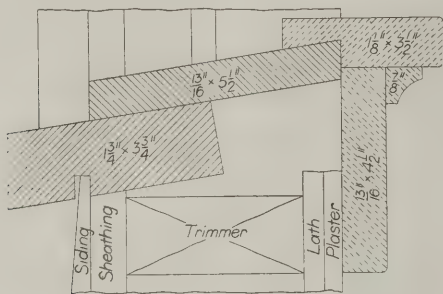


Fig. 5—Section Through Window Sill, Stool and Apron

the figure is a real help. A great deal can be accomplished through the little rough sketches following the items on the cutting bills, and if they are made with some pains, will show the style of sticking.

Bills marked "see detail" should be accompanied by a copy of the detail, and if it is expedient that more than one department use the same detail at the same time, there should be tracings made of it and furnished to each department, so that the work may go forward simultaneously to its completion.

Some foremen give out detached details when it is just as easy to give the group in their respective positions, and so give each workman an insight into the way the work is put together, and teach them to read working drawings. It is an easy step from the full-sized details to the smaller scale drawings, and then on down to the blueprint plans. If every man about a planing mill could read plans correctly, none of them would be any poorer workmen than they are, and a whole lot of them would be more efficient and thereby more valuable to the company and to themselves.

Figs. 3, 4 and 5 are given as an example of the grouping of details and constitute the head, side and bottom of a window frame for a frame building. The details tell this and all the other information necessary, except the size of the window and the class of material from which the frame is to be cut.

It will be noted that the inside trim is given a different shading than that of the frame proper, and is

not billed out at the time of making the frame. The idea of drawing it in with the frame is to show the opening as a whole and the relation each piece bears to its neighbors, as well as the way the frame members into the wall of the building. This is a great help in billing out the interior finish and in matching up the work at any future time. As in the example Fig. 1, the detail shows the parts exposed, so that the pieces required need be to specified grade only on those parts.

Fig. 6 shows one of a class of details in which it is good practice to number or letter the different members. These are really sub-details or the detailed details, and occur where it is necessary to make up the detail proper with a set of separate members. The same class includes veneered doors, windows and all kinds of laminated work. The sample in the figure is a cross section of a large bent molding, such as is used in the curves of church ceilings and groins. The several members are run separately on the molder and then bent and nailed in place one upon the other. The detail shows that only the edges of most of the members need be clear, so that the whole is strong enough to bend and nail in a way to give proper results.

The changing or altering of details is another of the

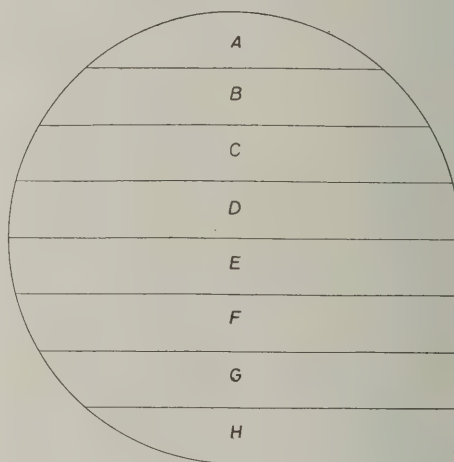


Fig. 6—One of a Class of Details in Which it is Good Practice to Number or Letter the Different Members

Economical Detailing of Mill Work

mill man's resources, of no mean value when worked with tact as well as ingenuity. In the first place, if the mill superintendent will take pains to keep the architect in a good humor and help him out of some of the corners he is bound to find himself in occasionally, he can nearly always secure permission to make minor changes in details to correspond with stock material or knives on hand. It is a rare case indeed where the owner would ever see or know the difference in detail.

Perhaps the most perplexing thing about details is the system, or rather lack of system, for filing details after they have been worked through a job. They may be collected and rolled up with the blueprints and filed in that manner, if the plans are not called in by the architect, but in the odd-work mill there are a multitude of details accumulating as the weeks go by, and are of such a nature as to preclude filing with the bills. About the only practical method I know of is to follow the same plan as in filing bills by the vertical alphabetical system, except that the index and folders should be much larger than for the cutting bills, and then it would be necessary to fold up the larger details into a compact compass, which would be neatly contained in the folder without obscuring the index.

Of course, all details should be marked with the name of the customer, the serial number of the order and the sheet number of the cutting bill. This will at once identify them and enable one to find the details from the cutting bill or find cutting bill from detail sheet.

CORRESPONDENCE

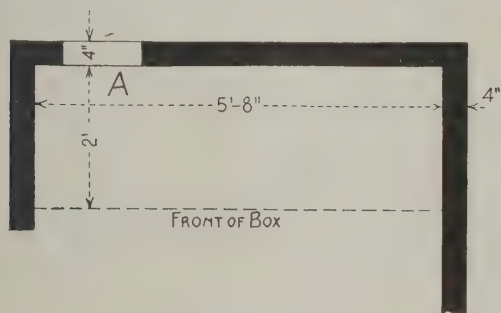
A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

Address Wanted

If the correspondent signing himself "A. J.," Chicago, Ill., will furnish the Editor with his full name and address we will take pleasure in meeting his requirements. We would state for the benefit of all contributors to the columns of the paper that it is essential that each one sign his communication with full name and address not only as an evidence of good faith but so that the Editor may communicate with him direct as the exigencies of the case occasionally render necessary.

Building a Stationary Ice Box

From W. W. S., Hempstead, N. Y.—For ten years I have been a subscriber of *The Building Age* and I now come to the Correspondence columns for assist-



Building a Stationary Ice Box

ance. I am about to build a stationary ice box in my pantry and would take it as a favor if some reader of the paper will send a sketch of such an ice box.

I would state that the one I am about to build is to be 5 ft. high, 2 ft. deep and 5 ft. 8 in. wide. The pantry walls are 4 in. thick, to be filled with whatever insulating material may be suggested. There will be a door at the back of the ice box, as at "A" of my sketch, so that the ice may be put in from the porch, thus doing away with the ice man coming in through the kitchen.

Why Does Blue Print Paper Turn Blue in the Roll?

From E. K., Kansas City, Kansas.—Will some one kindly tell me through the Correspondence columns why it is that blue print paper will turn blue in the roll. I had some wrapped in tracing cloth and covered with blue wrapping paper. It was put away in a bookcase. It had never been unwrapped since I bought it, yet when I went to use it I found that it was all blue.

Note.—The trouble which our correspondent describes may be due to the presence of more or less moisture in the paper at the time of its wrapping and putting away, or it may have been slightly exposed to light and become what is termed "light struck."

Another possible reason for the condition in which our correspondent found his blue print paper when he unrolled it was that it was purchased from stale stock—that is, paper that had been kept on hand a long time

before it was sold. It is for this reason that large makers of blue print paper carry little or no stock on hand but are constantly making up fresh supplies all the time.

Remedy for Dampness in Brick Walls

From Civil Engineer, Redford, N. Y.—I am inclined to think "W. A. D.," Madison, Ind., whose letter appeared upon page 79 of the February issue has a very bad case on his hands. If his brick are porous and contain much sand very little moisture comes from the bottom; if they contain much clay moisture comes from everywhere and stays. I occupied for a long time a room on the third floor of a brick building which would wet entirely through from the outside and I suspect this to be the case with "W.A.D."

The canvas roof over the tubes of the Britannia Bridge was painted with a compound containing 9 gallons of coal tar, 13 lb. of slacked lime, 2 or 3 quarts of turpentine or naphtha and dredged over with sand. If this is objectionable in the case mentioned by "W.A.D." I would coat the outside walls with cement in a vehicle of non-volatile oil, which will stand a temperature of 500 degrees Fahr. without decomposing, after which I should paint them any desirable pigment with boiled linseed oil; work between the brick and sidewalk and fill with tar. Let the water work down a while and then paint the basement part of the wall. Take off the paper, size the wall with alum and repaper.

Question in Masonry Work

From R. H. H., Rouses Point, N. Y.—As a reader of *The Building Age* I come to the Correspondence Department for information. I would like to have some practical mason or stone setter give a clear definition of "two-in-one uncoursed ashlar" and tell me how it is laid. All that our local masons are able to lay is a kind of step work as in the accompanying sketch, but I am sure this cannot be called two-in-one ashlar, as it is three and four to one in places.

According to specifications, two-in-one ashlar consists in every stone being followed by two and course



Question in Masonry—An Example of Step-Work

joints to run not more than 3 ft. before being broken. I am sure that if stone mason will enlighten me he will be benefitting other readers as well.

I have been reading *The Building Age* for two years

and find it an excellent magazine. My business is mostly in mason work and along with fast shingling I would like to see notes on fast bricklaying and fast plastering. My cousin and myself this last fall plastered a 21-room house consisting of 1800 yards of plaster and laid 2400 bricks in piers under porch in 10 days. The plastering was ivory plaster sanded, one coat. The architect said it was the best one coat job he ever saw.

Bookkeeping for the Jobbing Shop

From Edward H. Crussell, California.—While reading the communication from "J. H. M.," New York City, under the above head in the February issue, I was planning in my mind an answer to the inquiry along the line of what I would do in similar circumstances. As I read to the end, however, and saw Mr. Joslin's answer I realized that I was too late, Mr. Joslin having covered the ground very thoroughly in much better style than I could hope to do it. About all there is left for me to do is to endorse his remarks.

Like Mr. Joslin I would make the carpenter the foreman. Being a carpenter myself, modesty forbids me praising the intelligence and reliability of the fraternity in the manner he does, although strictly speaking, however, I know from experience that he is right.

One very good reason for making the carpenter foreman was overlooked by Mr. Joslin, and that is this: he is the one mechanic that will have to show up on practically every job of repair work no matter how small. It is a safe bet that if your mason has a dozen bricks to replace on the top of a chimney and the matter is left to his decision it will be utterly impossible for him to touch that job until the carpenter has built a scaffold around it the size of a city lot. In like manner, if your "plumberandhishelper" has a leak to stop and can do it without having the carpenter tear up a square of flooring and bore three 2-in. holes through the floor joists, you have a prize. I know, my brothers, I know; believe me, I *do* know.

My way of handling requisitions would be a little different to either of the ways mentioned. I would have the foreman size up the job and make requisition on the real estate office; then let the office supply the material, either by 'phoning direct to the store or by issuing a purchasing voucher to the foreman. In either case the foreman should O. K. receipt of the material and be responsible for it.

By this method it will not be necessary to make all purchases at the one store, but it will allow a comparison of prices and eliminate a chance of graft on the part of the storekeeper. This fellow has been overlooked by both "J. H. M." and Mr. Joslin, though most people know from experience that he does not average any more honesty to the ton than the rest of us. When he knows that all business is going to come his way anyhow, he is sometimes more interested in disposing of the stock on hand than in ordering new stuff that will more nearly fill the bill. A present of a ten cent pocket knife occasionally helps out in the transaction.

This is no "muck raking" essay and I do not for a moment suppose that this cap will fit any storekeeper among the readers of *The Building Age*, but if it does he'd be very foolish to put it on and wear it in public.

And now for a final word, let us return to the foreman. Make this fellow's job worth while. Make it either by more pay, steadier work, or some special privilege, just a little better job than any he can hope to get anywhere else; make it a job he will be afraid to lose, and then—make him deliver the goods. It is not always easy to find the right man, but just as soon as you know you have him, pay him all he is worth. Do not wait for him to ask for it, for he will be dissatisfied with existing conditions some time before he tries to change them,

and for every day that he is dissatisfied you are losing some of his best licks.

Questions in Water Tank Construction

From T. J. G., Nassau, Bahamas.—Will Mr. Gray, whose article appeared in the January issue of *The Building Age*, tell me the height and diameter to make a circular tank to contain 5,000 gallons and what size shall I make the bottom of it? My supply of rain water is short every year in the dry months and I am thinking of building a tank of this kind.

Can he tell me what lengths of hoops will be required for the circular tank? I want round hoops galvanized. I do not agree with him that flat hoops are the best, as they hold too closely and the wood rots under them. I have fully demonstrated this point by three tanks which I have built.

Answer.—In commenting upon the above, Mr. Gray says: Having no data as to elevation or location of tank, nothing can be done in the way of erecting one of dimension to suit local conditions. A tank 10 ft. in diameter and 9 ft. high will give about the capacity required when due allowance is made for the over-flow level. For this size, the bottom should be at least 2 in. thick, although 2½ in. would be better. The thickness of staves should be 1¾ or 2 in.

A 5,000 gallon tank is a small matter, and if it is intended to use round hoops no very serious attention need be paid to hoop formula. Round hoops will sink into the wood because of the little bearing surface, and this feature is usually somewhat aggravated by swelling and drying of the staves, requiring more attention for round than for flat hoops.

There should be 10 to 15 hoops ¾ in. in diameter, according to the type of wood used. They may be located as to height in about the same way as shown on page 15 of the January issue of *The Building Age*. The length of the hoop rods will depend upon the type of tugs used. Any windmill tank concern or silo builder can furnish tugs or hoops complete if desired.

Plans for a House for a Corner Lot

From H. C. Winans, Hood River, Ore.—In answer to the request of "R. W. A.," Union City, Pa., I am sending for publication the floor plans of a house which I trust may be of interest to him as well as to some of the other readers of the paper.

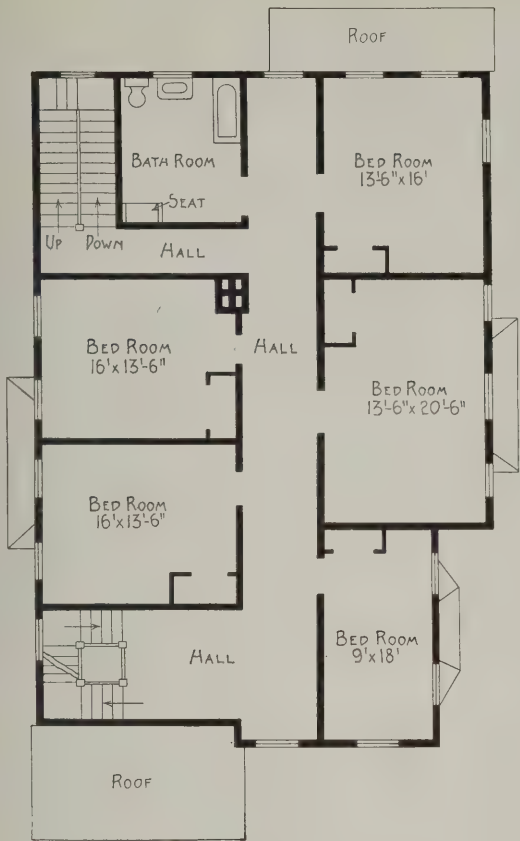
From H. F., Mt. Vernon, N. Y.—Noticing in the February issue of the paper the inquiry of "R. W. A.," Union City, Pa., for plans of a house to contain kitchen, bedroom, dining room, sitting room and parlor on the main floor and with several bedrooms and bathroom on the second floor, I am sending drawings which may be of interest to him.

It will be seen that I have placed the sleeping room on the main floor directly off from the kitchen on the assumption that it is to be used for the servant. The bedrooms on the second floor are arranged at the right and left of a central hall with bathroom at the rear.

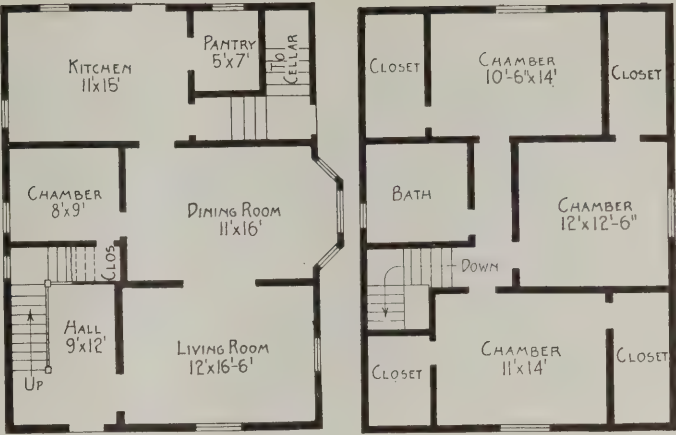
From W. A. B., Plano, Ill.—In looking over the February issue of *The Building Age* I notice the request of "R. W. A.," Union City, Pa., for a set of plans for a house suitable for a corner lot, and as I have just drafted a set which I think will please him, I am sending a rough sketch of them herewith. The house is to be built here at Plano.

Estimating Cost of a Store Building

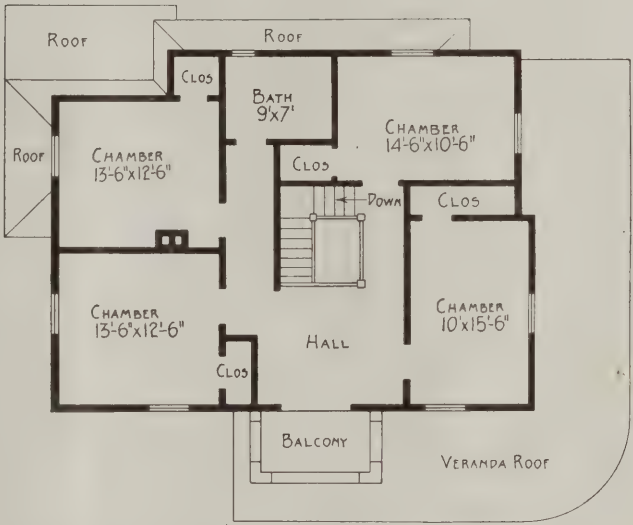
From G. S. C., Rahway, N. J.—Will some of the many readers of *The Building Age* who have had experience in this particular line tell me how much it will cost to



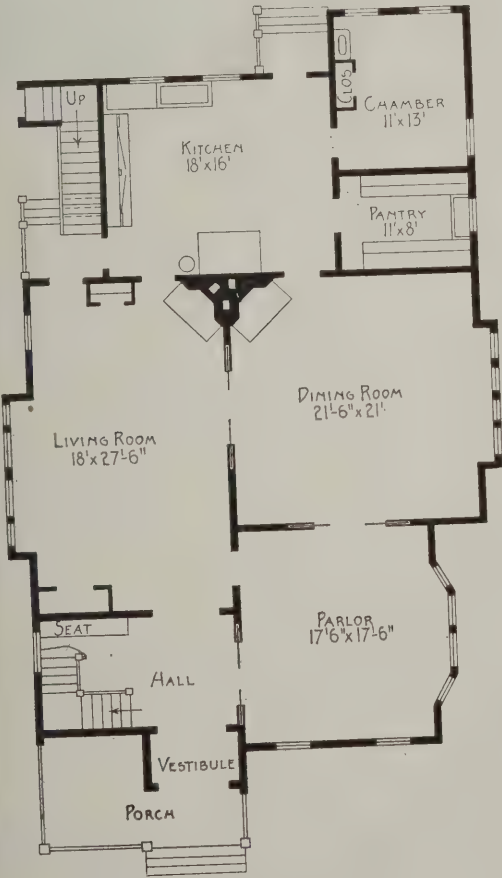
Second floor plan submitted by "H. F.," Mt. Vernon, N. Y.



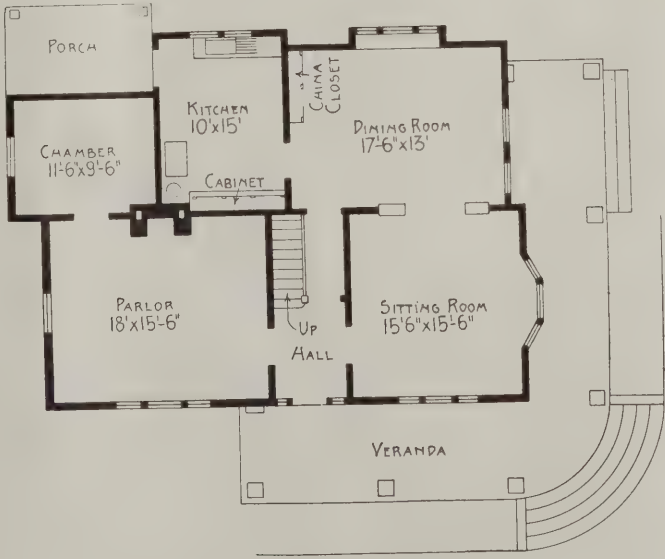
First and second floor plans contributed by "W. A. B.," Plano, Ill.



Second Floor Plan Submitted by H. C. Winans of Hood River, Oregon



First floor plan submitted by "H. F.," Mt. Vernon, N. Y.



First Floor Plan Submitted by H. C. Winans, Hood River, Ore.

build a store for drygoods having a frontage of 30 ft. and a depth of 80 ft.? It is to be three stories and cellar and the ground floor will be used for a store, while the two upper floors will be utilized for offices.

The building is to be constructed of hollow tile. Any information will be greatly appreciated.

Cleaning India Oil Stones

From W. N. B., Martins Ferry, Ohio.—Answering the inquiry of "P. M. H.," Sedalia, Mo., in the November issue of the paper, I would say boil your India oil stone in soft water for 30 minutes and you will not harm the cutting quality or harden the stone, while at the same time it will remove all grease and gum. The result will be that the stone will appear as bright as when new.

Drawings for a Roll Top Writing Desk

From F. H. S., Athol, Mass.—I would say to "A. W. S.," Paterson, N. J., that he will find complete drawings for a roll top writing desk in a little work entitled "Mission Furniture," Part One, price 50 cents, which can be had from *The Building Age Book Department*.

Materials Required in Laying 1000 Brick

From H. J. Aurlie, Spring Valley, Minn.—In answer to "W. F.," Denver, Colo., whose inquiry appeared in the January issue of *The Building Age* relative to the amount of materials required for different kinds of mortar to lay 1000 brick, I submit the following calculations:

I would say that 1000 common brick laid in lime mortar, joints $\frac{3}{8}$ to $\frac{1}{2}$ in. and with proportions of one of lime to five of sand, will require three bushels of quick lime (3.7 cu. ft.) and about 18 cu. ft. of sand. This would make the cost of mortar per 1000 brick about \$1.90.

This is estimating the cost of materials delivered on the premises as follows: Lime per bushel 30 cents; sand per cu. yd. \$1.50, and Portland cement \$2 per barrel. Brick, kiln count.

Now 1000 common brick laid in Portland cement and sand with joints $\frac{3}{8}$ to $\frac{1}{2}$ in. and in the proportion of one of cement to about $3\frac{1}{2}$ of sand will require 1.25 barrels (5 sacks) cement to 18 cu. ft. of sand. The cost of this mortar per 1000 brick based on prices quoted above would be \$3.50.

The materials required to lay 1000 common brick composed of two-thirds cement to one of lime and 6 parts of sand, would be two sacks ($\frac{1}{2}$ barrel) of cement; one barrel ($2\frac{1}{2}$ bushels) of lime, and 18 cu. ft. of sand, and the cost of this mortar for 1000 brick would be \$2.87.

The mortar for face brick work would cost about the same, depending on the size of the joints and the proportions of the materials used. In case the mortar is wanted as white as possible more white lime should be used in proportion to the sand and as white a sand as possible should be procured.

The lime should by all means be slacked several days before using. I think the best way in using coloring in the mortar for face brick work is to thoroughly mix the dry sand and the coloring together before mixing with lime. If cement is also used, this, too, should be mixed in the sand when dry. Some cement should be used in all mortar for outside brick course.

The amount of coloring required to lay 1,000 brick will depend somewhat on the shade required, and it is hardly safe to figure less than 100 lb. The coloring material, sand and lime should all be carefully measured so as to maintain the same proportions through-

out, to the end that when mortar is dry in the wall it will all be of a uniform and even shade.

In face brick work where it is desired to use colored mortar the brick should be well wet, in dry weather especially, for unless this is done the dry brick will quickly absorb the moisture from the mortar and with it the coloring, leaving the mortar joints lighter in shade than intended and also uneven.

With the cost of the coloring materials and the extra work of mixing and measuring the coloring ingredients it is worth from \$3 to \$4 per 1,000 brick extra for colored mortar on small jobs.

Below will be found a table which may be of value to some of the younger men in the building trades. It shows the quantity of mortar required to lay 1000 brick—kiln count—with varying sizes of joints, the size of brick being about $8\frac{3}{8} \times 2\frac{3}{8} \times 4$ in.

Joints $\frac{3}{16}$	require	8 cu. ft. of mortar to the 1000 brick
Joints $\frac{1}{4}$	require	10 cu. ft. of mortar to the 1000 brick
Joints $\frac{5}{16}$	require	12 cu. ft. of mortar to the 1000 brick
Joints $\frac{3}{8}$	require	15 cu. ft. of mortar to the 1000 brick
Joints $\frac{1}{2}$	require	18 cu. ft. of mortar to the 1000 brick
Joints $\frac{5}{8}$	require	22 cu. ft. of mortar to the 1000 brick
Joints $\frac{3}{4}$	require	26 cu. ft. of mortar to the 1000 brick

According to "Trautwine's Civil Engineers' Pocket-book" the bulk of the mixed mortar will usually exceed that of the dry loose sand alone by about $\frac{1}{8}$ part.

In calculating the amount of cement mortar required for a certain amount of brick work, for instance, the proportions are to be one of cement to three of sand, basing the amount of mortar required for 1000 brick on joints $\frac{5}{16}$ in. thick as per the table above. This would require 12 cu. ft. of mortar and a mixture of 1:3 would equal 4 cu. ft. of cement or one barrel. The cement added to the sand in this proportion will not increase the bulk of the mortar but rather diminish the whole bulk.

The cement mortar of the above proportions would cost for 1000 brick with $\frac{5}{16}$ in. joints \$3.00.

The brick work in the vicinity of Spring Valley is usually laid for so much per thousand—from \$5 to \$7, depending upon the construction and thickness of the walls. This is for common brick and bricklayers' wages from 65 to 75 cents per hour.

Fine pressed brick for store fronts, etc., is worth to lay per thousand from \$15 to \$25, depending of course on openings and the construction in general. These prices include the bricklaying and tending. Some very fine brick designs might cost much more than this.

Hanging Three-Butt Doors.

From Hee H. See, Sacramento.—In answer to "C. R.," Appleton, Wis., I would state that the placing of the butts on a door is all a matter of taste and there is no definite rule for the guidance of the workmen. In the absence of definite instructions place the butts where they look the best to you and if any one finds fault make him *prove* that you are wrong before you give in.

Set the top butt 6 in., 7 in. or 8 in. from the top of the door and the lower butt 9 in., 10 in. or 11 in. from the bottom. The writer has seen all these measurements used in their various combinations and in every case they satisfied some one. For three-butt hanging in his own work the writer always sets the center butt midway between the other two, because to him that seems to be the proper place for it.

From U. P. G., Lewisburg, Pa.—I read in the Correspondence columns the letter from "C. R.," Appleton, Wis., about placing butts on doors. I wish to say a few words in regard to the matter as I have had a long experience in hanging doors in different locations.

The top hinge is generally placed 6 or 7 in. below the top door rail, or to suit the molding or trim of the door panel. With regard to the bottom hinge I place

the lower edge of the hinge to line with the top of the bottom rail.

Now as regards the center hinge I measure the distance from the center of the top hinge to the center of the bottom hinge and I place the third butt midway of this distance. I have seen some mechanics place the hinge above the center and then again I have noticed others who placed it below the center. Where I have charge of work I order the butt placed in the center and when I hang doors for other parties I ask for instructions and then follow them. I find it is only a matter of opinion, some wishing it one way and some another.

A Modern Dairy Barn

From H. E. Talbot, Willoughby, Ohio.—I am sending under separate cover a picture showing the exterior of a barn just erected by me in this vicinity, also two interior views indicating arrangement of the stalls.

The barn is 42 x 102½ ft. on the ground and is equipped for 48 cows. It is built of 2 x 6 in. studding 12 ft. long and placed 2 ft. on cen-



A Modern Dairy Barn.—Fig. 1.—General Appearance of the Barn Erected for the Estate of F. M. Osborn at Willoughby, Ohio

ters; 2 x 6 in. rafters; 6 in. cove drop siding and 10 in. shiplap for the roofing. The roof is covered with a good graveled felt. The barn is arranged for two rows of cows facing the center. The feed alley is 9 ft. wide between mangers and has doors at either end so that a wagon load of feed can be driven through and unloaded from both sides.

The alleys behind the cows are 7½ ft. between wall and gutter with drive-way doors at either end so as to get through with a wagon in case the litter carrier breaks down. The gutters are 14 in. wide and graded from 8 in. to 10 in. deep.

The space between the gutter and the stanchions has a 4-in. cement curb next to the gutter and the rest is paved with cork brick. The concrete curb on which the stanchions set is 6 in. above the finished standing floor and is 6 in. thick. The 12 iron pipe posts of 4 in. diameter that carry the upper floors pass down through this curb and help support the stanchions.

The mangers are 2 ft. wide and the bottom is nearly on a level with the standing floor.

The side walls of the barn are covered with burr-cut sheathing and plaster. The ceiling is lathed and

plastered and has three hay chutes from the loft above that are closed by a hinged door with cord and weight.

The barn is equipped with the "Star" adjustable steel



Fig. 2.—A View Through the Feed Alley Showing Cow Stalls at Right and Left

stanchions and litter carrier and the "King" system of ventilation.

There is a loft above the main floor that has a capacity of 50 tons of bulk hay and can be filled with a hay carrier that runs from a projecting head block in the gable back through the length of the barn. The upper gable of the barn is provided with large folding doors that give plenty of room to admit of a loaded hay fork or slings. The interior casings of the barn are of yellow pine and are finished natural in varnish. There are 27 windows each with 12 lights 10 x 12 in. and the feed alley doors are also glazed.

There are a number of Cleveland business men owning farms in this section and as a result quite a rivalry exists over dairy and stock barns, but the one here illustrated is conceded by all who have seen it to be among the most up-to-date barns in northern Ohio.

Why Are Not Reversible Windows More Extensively Used?

From R. C., New York City.—Having had the opportunity of looking through the records of the Patent

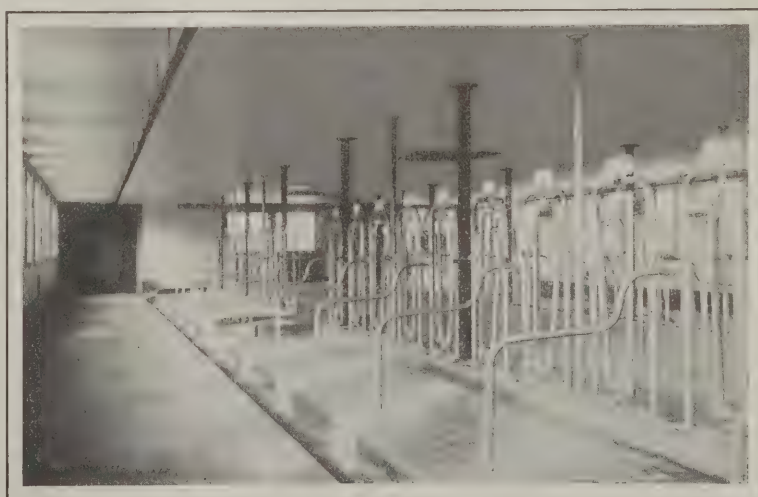


Fig. 3.—Looking Down the Side Alley, Giving a Rear View of a Row of Cow Stalls

Office some time ago, I was struck with the number of patented devices for opening ordinary double hung sashes into the room whereby the outside of the window

may be cleaned from within and avoid the dangers necessitated by sitting outside. A sliding rod hinge is formed on one side on which the window swings inward. A cord detaching device engages and releases the cord at the opening side, which is a very desirable arrangement, and I am curious to know why there are none or very few on the market and never seen in New York.

Do the building regulations forbid their use? Do the public not want them, or have such patents never been pushed by the patentees?

Has no manufacturer considered any of them good enough to take up, or why have they not caught on? Surely in a city where high buildings are the rule and there is so much danger in window cleaning there ought to be a demand for something of the kind.

I feel that some readers of *The Building Age* acquainted with the conditions and building regulations here could give some reasons why these patents have never come to light, and what difficulties stand in the way of the public benefiting by these devices.

Proportions of Materials for Cement and Lime Mortars

From R. T. W., Montreal, Canada.—I would like to learn through the Correspondence columns in the next issue of *The Building Age* the proportions of materials for cement mortar and lime mortar; also the amount of each required to lay 1,000 bricks.

Answer.—Lime mortar is made by mixing clean sharp sand with slacked lime in the proportion of one

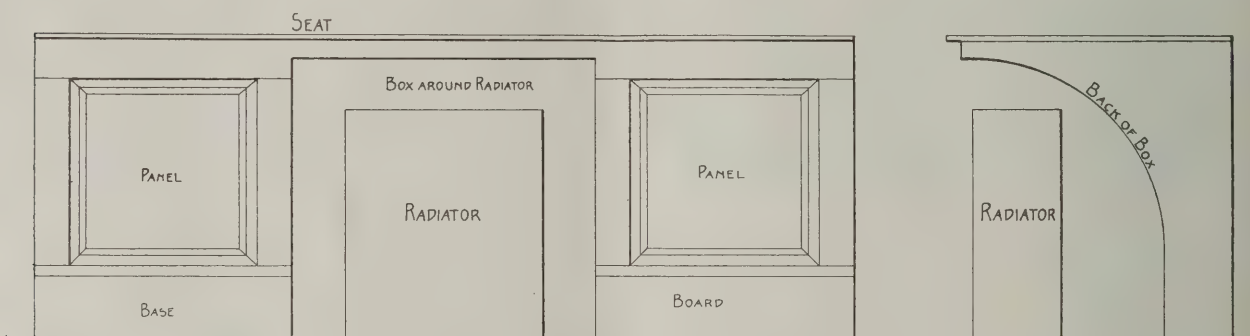
Heavy Barn Framing

From D. P. B., Redford, N. Y.—I would like to say to "W. A. B.," Todd, Okla., whose very interesting comments appear in the February issue of the paper, that we still build the same timber frames as of old but the owners have not the pride of the generation gone. Nowadays it is "chuck it up no matter what it looks like." Last July I built a 30 x 40-ft. barn of ash and elm hewed without a line. One girder was hewed only on one side, twisted and crooked; a log at one end and a pole at the other, and the help did not even own tools. The owner growled about the cost before the first day had ended.

To frame that barn in nine days; raise it without five minutes' delay; see the mortises and tenons going together with chain and bar and sledge, was genuine balm. As the worst bent went together like a new wagon, some one remarked, "He's an expert on crooked timber." A white-headed old-timer of another age came up and said, "You're a workman." The sills and one plate had to be spliced. I was a stranger and if anything had gone wrong the timber and the help would not have been blamed.

Building Window Seat Over Radiator

From F. W. C., Lansing, Mich.—I will say to "O. R. M. G.," who inquired in a recent issue, that I built a window seat over a hot water radiator last season and the method has given entire satisfaction—at least so the owner of the house has just told me. We finished the front under the seat in the usual way, leaving an opening 8 in. wider than the radiator. We then made



Building a Window Seat Over Radiator—Sketch Accompanying Letter of "F. W. C."

part lime to from two to five parts of sand by volume. The New York Building Code requires that not more than four parts of sand to one part of lime shall be used. It is seldom that the proportion of sand is carefully measured, but the sand is added until the person mixing the mortar considers it of proper proportion.

In the case of cement mortar the proportion of sand varies according to the kind of cement and work for which the mortar is to be used. For masonry and brick work one part cement to two, three or four parts of sand are used according to the strength required. For some special purposes five or even six parts of sand have been used. For face brick work the proportions are usually one part cement to two parts sand; for backing and in ordinary masonry foundations one part cement to three parts sand. For cement plastering equal parts of natural cement and sand are used. For the top surface of floors and walks one part Portland cement to from one to one and a half parts of sand are used.

As regards the amount required to lay 1,000 bricks we would refer our correspondent to the very interesting article which appeared in the February issue under the title "Buying Building Materials Economically."

a galvanized iron box with curved back and straight ends. We covered the outside of the box with asbestos paper to protect the seat from getting too much heat.

The box was made for the purpose of helping the warm air to easily flow out into the rooms and we closed up the opening to make a neat looking job. The sketches which I send represent the front of the window seat, together with an end view.

I would say that I have been taking *The Building Age* seven or eight years and like it very much.

From I. M., Passaic, N. J.—In answer to the inquiry of "O. R. M. G.," Chicago, Ill., in the March issue of the paper, I want to say that if the radiators shown in the sketch are of the ordinary design it is not desirable to have them underneath a seat, as the latter would prevent the escape of air into the room and thus affect the heating efficiency of the radiators. The best "O. R. M. G." could do is to place the seat at least 2 in. from the wall so as to provide some free passage for the heated air, also if the radiators are heated by steam the under side of the seat should be lined with asbestos or some other non-conducting material, otherwise the seat will be uncomfortably warm.

However, to make a first-class job, I would recommend the use of a special window seat radiator made

with curved flues. These radiators are usually 14 in. high and 13 in. wide.

From B. P. D., New York.—My suggestion to "O. R. M. G.," Chicago, Ill., is to build his window seat leaving good openings over the radiators. Then cover them over with nice perforated material like a cane-seat chair or build the whole seat of that mat.

Further Comments on Winding Stair Rails

From C. C. Grant, Red Deer, Alta., Canada.—Although much discussion has already been presented on the subject above indicated, the letter of "C.F.S." in the February issue of the paper prompts me to offer some further comments. In regard to the tangent plank being of insufficient thickness to contain a helical blank, I think that Fig. 4 in the article of "Triangulus" in the issue for April last year will convince any one who is open to conviction.

The correspondent "C.F.S." admits that his demonstration in the December issue fails when the blank is reduced to its center line and the plank is consequently reduced to its center plane, because the diagonal of the blank is not available. It will be seen that $x-2$ and $x-4$ of his Fig. 1 represent the positions of this center line and center plane. Suppose a line be dropped from x perpendicular to the plane, it is evident that the line must have some length, otherwise one x would coincide with 2, the other with 4.

Next consider the blank gradually increased in size. It is evident that it can be increased until one-half of its diagonal—the diagonal being the greatest possible thickness of the tangent blank—equals the perpendicular line mentioned above before the surface of the plank can possibly reach x on the middle line of the blank, let alone reach the further corner of the blank. It is thus seen that the diagonals leave the December demonstration still a failure.

Again, the correspondent claims that unless some error is shown in his December demonstration his conclusions must stand. Take Fig. 5 of that article for instance. No attempt whatever is made to draw the helical lines correctly, for in parts they are represented as straight and coinciding with the plank lines or omitted altogether. This occurs on the top of the figure between the lower quarter cross section and the lower end section and at the bottom of the figure between the upper quarter cross section and the upper end section. The quarter sections are inserted to suit the so-called helical lines; the end sections are inserted to suit the plank, and as a consequence represent a cross section of a blank considerably larger than the blank represented by the quarter sections. The author was thus enabled to intimate that the tangent system furnishes a plank as thick as the one he draws. Had he drawn the helical lines correctly at the parts where he represents them as straight and inserted the end sections accordingly, the result would have demonstrated at once that the plank of the drawing is thicker than the tangent system furnishes (see Fig. 4 of "Triangulus" article in the April issue for 1912).

With this simple correction Fig. 5 demonstrates that the tangent system does not produce a helical blank and that the system advises that stairs be built so that regular and helical blanks cannot possibly be put on them.

In order that a regular and helical rail can be put on a stair it is necessary that the center line of the rail should climb at the same pitch on the circular parts of the stair as on the straight parts of it. In other words, since the risers are always the same it is necessary that the measurement of all steps measured along the center line of the rail on the ground plan should be the same, so that if the stair were unfolded along the center line of rail on the ground plan the top of the risers would be in a straight line and thus enable the center lines

of the wreath blank and straight rail if unfolded to also be a straight line.

It is evident that if the steps on the circular parts varied from those on the straight parts when measured as above, then the pitch of the center line of a helical blank would vary from the pitch of the center line of rail on the straight part and that a "kink" would inevitably result at the junction. In other words, it is evident that a regular and helical blank could not possibly be put on such a stair.

Take as a sample of the tangent method Fig. 15 shown on page 75 of "Common Sense Handrailing," copyrighted 1903. Tangent men when allowed to choose invariably build such a stair so that the radius of the circle of the center line of rail on the ground plan equals half a step on the straight; that is, the step on the quarter circle measured along the center line of rail on the ground plan equals only $11/14$ of a step on the straight; that is, they build a stair so that a regular and helical rail cannot possibly be put on it.

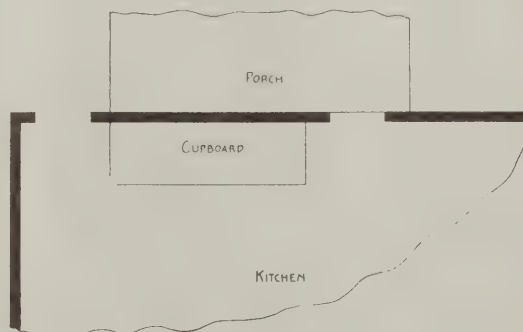
What follows deals only with stairs in which the ordinate passes through the junction of the tangents and center of the circle on the ground plan, such as Fig. 15 of the previous paragraph, which is the only case in which a helical blank could possibly be claimed for the tangent system.

The tangent blank at a joint climbs in the same way as the tangent used to secure the joint. Now, if the blank continued to climb in that way it would climb in the same manner as do the tangents, but since the tangents to a circle or an ellipse are always longer than the curve and climb no higher than the curve, it follows that the curve cannot possibly climb as do the tangents but must in every case climb faster. In other words, the tangent wreath in every case starts with the pitch of the tangent and later increases its pitch or, in other words, the tangent wreath can never in any case climb uniformly as does a helix.

Let it be distinctly understood that "C.F.S." deals with only one, and that by no means the worst, of the many errors of the tangent system.

Preventing Moisture in a Kitchen Cupboard

From M.E.T., Batavia, N. Y.—Being an old subscriber to the paper I would like to ask for a remedy which will prevent moisture from accumulating in a kitchen cupboard arranged as shown on the sketch



Preventing Moisture in Kitchen Cupboard

herewith. The kitchen is heated by means of a gas range placed on the side of the room diagonally opposite to the cupboard.

The inside of the cupboard is lathed and plastered and outside under the porch the wall is constructed by nailing the clapboards directly to the studs. Above the porch floor, the outside wall is built in the usual way.

I would state that the moisture gathers only in winter and I want to know if there is any way of lining or ventilating the cupboard to prevent dampness. Food placed in the cupboard is unfit for use if it is left there for any length of time.

ESTABLISHED 1879

THE BUILDING AGE

Formerly CARPENTRY AND BUILDING

Copyright, 1913, by David Williams Co.

Entered at New York Post Office as Second Class Mail Matter

Published Monthly by the

David Williams Company

239 West 39th Street New York

W. H. Taylor President and Treasurer

Fritz J. Frank Secretary

M. C. Robbins General Manager

Henry Colwell, Editor

J. B. Bennett, Business Manager

Editorial and Business Staff

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Subscription Rates: To all parts United States and Mexico, \$1.00 a year; to Canada, \$1.25 a year; to all other countries, \$2 a year.

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Licensing of Builders

For some time past there has been growing in many sections a sentiment in favor of the licensing of builders, something after the nature of the laws existing in many states requiring those desirous of practising architecture within their borders to pass a prescribed examination. This sentiment has recently taken tangible shape in New York City by the introduction at Albany of a bill calling for the examination and licensing of builders. It creates a Board of Master Builders' Examiners to be appointed by the Mayor within 90 days after the bill becomes a law. This Board is to consist of five men—two mason builders, one master carpenter, one structural steel builder and one reinforced concrete builder—all of whom must have had ten years' practical experience. The members are to receive \$10 per day for actual service performed. One provision of the bill requires all builders to pass an examination and be registered before they can construct buildings within the city limits. Power is given to the Superintendent of Buildings, who will also be an ex-officio member of the Board of Examiners, to revoke licenses. Failure to comply with the law is made a misdemeanor.

Suggested Additions to the Bill

Some of those who have expressed an opinion in regard to the matter feel that the bill does not go far enough to accomplish all that is intended by such a measure. While it makes it necessary for any builder to successfully pass an examination in order to be registered, it fails to prevent others than builders from engaging in building construction. It exempts from the requirement architects or architectural engineers, but does not define what constitutes an architect or architectural engineer, and there is no restriction that would prevent any one from taking that title. Superintendent Miller of the Bureau of Buildings for the Borough of Manhattan, voices this feeling of inadequacy when he states that what is wanted "is not the licensing of builders but the restriction of building operations to persons registered under whatever rules may be provided for that purpose. The right to undertake building operations should not be restricted to builders alone, but architects, builders, building superintendents or even owners, if they desire to undertake the work themselves, should be subjected to such rules as may be prepared. The party undertaking such work should be held accountable to the end. The trouble now is that it is difficult to place the responsibility for unsatisfactory work on any particular individual. To restrict the undertaking of building operations to builders who have passed such examination seems to me an interference with the rights of any one to engage in a business. It is only when a person abuses the right to do anything that he should be prohibited from further engaging in such work." The outcome of this movement looking to the licensing of builders will be awaited with a great deal of interest, not alone by those engaged in the industry in and about New York City but by builders in every section of the United States.

Location of Registers in Houses

It is improbable that there will be any great difference of opinion among those experienced in the trade as to the location of registers in houses in which furnace heating equipment is installed. The majority of experienced furnacemen favor the shortest possible pipe from the furnace and the register located near one of the inside rather than near one of the outside walls. It has been given as the experience of successful, observing furnacemen that registers near the outer walls are not so efficient as if placed contiguous to the interior walls of a room. With any system of heating the warm air at the ceiling, on approaching the outer wall strikes a cooler surface and falls along the wall increasing in velocity as it follows down the cooler wall until it drops with some positiveness near the floor. Consequently, when a warm-air register is located in the path of these down currents the warm air that should rise from it is retarded and in some instances the outflow is entirely stopped. This leads to a down current of this cool air through the pipes to the furnace, if the furnace is not adequately supplied with air from some other point. Invariably to locate a register near an outer wall means a longer pipe with an attending loss of heat in the cellar. There have been those who have observed that the location of a radiator and a register are selected from directly opposite points of view. Radiators as a rule are placed under windows where the greatest amount of cold air falls so that they can warm it as it falls or drive conflicting currents of warm air against it while the radiator proper sends its heat into the room. Registers should be so located that the warm air from the heater will be carried as quickly as possible from it to the rooms, where it will diffuse through the room in such a way as to warm it before it is chilled too much by contact with the cooler surfaces of the exposed walls.

Public Sanitary Conveniences

The advocate of improved sanitation may find encouragement in the fact that the need of sanitary conveniences in public places is becoming more widely recognized and even in the smaller towns and cities that have no available funds with which to provide public comfort stations some efforts to take care of the public are being made. It is remarkable that the establishment of public comfort stations has been so widely taken up throughout the United States and that news of new constructions comes from many sections. Notwithstanding this fact it will probably be some time before the needs of the public can be taken care of by stations erected with public funds and consequently the extension of the Pasadena idea is likely to serve the public in the meantime. Information comes from Washington that some of the large stores during inauguration week conspicuously displayed cards bearing the universal public comfort station mark, adopted by the American Society of Inspectors of Plumbing and Sanitary Engineers, indicating to visitors that within the buildings there were sanitary conveniences at their disposal. At the same time there comes from Waterloo, Iowa, information that preparations are

being made for a campaign among the large store keepers of that city to put their toilet rooms in such condition that they may be readily used by the public and to display this mark for the guidance of the people.

Our Cover Design for May

The design of the front cover for the May issue of the paper will relate to a country house of Colonial *motifs* well adapted for execution in any section of the country. A feature of the main floor plan is a living room extending entirely across one end of the house, a central hall running from front to rear and a kitchen occupying a wing at the rear corner of the house. On the second floor are three sleeping rooms, a maid's room and bathroom. The design is one which we feel sure will interest a large class of readers.

Plans for the New Morgan Building

The plans which have been filed for the new banking house at the southeast corner of Wall and Broad streets, New York City, call for a structure about four stories in height built entirely of marble in the Italian Renaissance style of architecture, the stone being from the Knoxville quarries. While from the exterior the building will appear to have four stories, it will really have only two floors, one devoted to the banking quarters and the second to executive offices and conference rooms. The site has a frontage of 113.5 ft. on Broad street and 156.9 ft. on Wall street.

The foundations will be of the caisson type carried to bed rock, which at this point is about 60 ft. below the street level. The foundations will be prepared so that they can safely carry 35 or 40 additional stories in case it is desired at any time in the future to put up a tall building. By this arrangement no alterations to the foundations will be necessary. The plans were drawn by Trowbridge & Livingston, architects, who estimate the cost at \$1,200,000. The new structure will replace the historic Drexel Building erected more than 40 years ago.

Steel Frame Buildings in Foreign Countries

The steel skeleton frame building for business purposes has developed a constantly widening area of popularity if it may be so termed and now it is not altogether uncommon to find steel frame buildings of American design being erected in leading cities throughout the world. The buildings in question have not as yet assumed the proportions of the American office building which towers hundreds of feet above the level of the curb and in some instances seems to almost pierce the clouds, yet the tendency of development is along these lines, and as the years go by the number of buildings of American design erected in foreign countries is likely to multiply. What is said to be the largest as well as the tallest building in that city has just been completed at Buenos Aires in the Argentine Republic. This is the first modern fireproof building of its kind in the city and is known as the Plaza Hotel. It is nine stories in height with a frontage of about 197 ft. and a depth of 187 ft. The maximum height above the level of the sidewalk is a little over 200 ft. The erection of this hotel resulted in a further important development in the shape of steel construction apartment houses, of which a number are now under construction at Buenos Aires.

Other important examples of modern building construction, although not of the skyscraper type, are two buildings at Rio de Janeiro. One of these buildings, the artistic National Library of Rio de Janeiro, is a

modern steel frame building, four stories high, with basement and dome, approximately measuring 100 x 208 ft. The quantity of steel furnished for this building was 1,500 tons. This was the second structure of its kind in Brazil, the first one being the Fire Department Building at Rio de Janeiro, four stories, with a central dome eight stories high.

In almost every country in South America structural steel from the United States for the construction of high buildings is being used and most often by American firms and foremen.

Another instance of American work abroad is the construction of the group of buildings for the American College for Girls at Constantinople. There will be seven main buildings and a power plant, from the plans of Shepley, Rutan & Coolidge of Boston, and all to be equipped with American machinery and fixtures, including the plumbing, heating and ventilating apparatus. The buildings will be constructed mainly of reinforced concrete with the aid of American machinery sent from here expressly for this work.

Preparations for the Panama-Pacific Exposition

Although two years in advance of the opening day of the Panama-Pacific International Exposition, which is to be held in San Francisco in celebration of the completion of the Panama Canal, and which will open its doors to the public on Saturday, February 20, 1915, great progress has been made and the work has reached a stage of accomplishment in all its departments which, in the opinion of expert observers, has not been exceeded by the last two expositions a year before their opening.

The plans for all the exhibit palaces have been completed and approved, and from this time forward contracts for their erection will be awarded at the rate of two a month. It is expected that all buildings will be completed under contract by June 25, 1914.

Twenty-six American commonwealths have selected sites for their state buildings, and more than 2,000 applications for concessions have been received by the Panama-Pacific Exposition in San Francisco. It is stated that 14 of the exhibit concessions will involve an expenditure of more than \$2,000,000. Among the concessions will be a reproduction of the Grand Canyon by the Atchison, Topeka & Santa Fe Railroad; a working model of the Panama Canal with a capacity to accommodate 2,000 people every 20 minutes; a panoramic spectacle of the evolution of the American navy; a reproduction of the Grand Triamion at Versailles, reproducing the historic battles of Napoleon and the Creation based on the first chapter of Genesis.

It is interesting to note that work upon the Hall of Machinery, which will be the largest of the eight exhibit palaces, was commenced the second week in February and is expected to be completed by the fall of the current year.

Building Operations in Honolulu

During 1912 Honolulu gained in new buildings to the value of \$2,202,152, while permits for repairs, etc., totaled \$179,271. For dwellings costing more than \$2,000 each 94 permits were issued, the average being \$4,134. For business structures 32 permits were issued, averaging \$13,563. For public buildings the 12 permits averaged \$17,040. For miscellaneous structures, such as church, society and private school buildings 14 permits were issued, averaging \$10,813.

The Honolulu Iron Works will erect during 1913 a reinforced concrete office and sales building to cost \$150,000.

Largest Single Bakery Building in the World

Within a comparatively short time New York City will have the largest single bakery building in the world, occupying as a site the entire block bounded by 15th and 16th Streets, 10th Avenue and the new Marginal Street adjoining the Hudson River. The old brick buildings formerly occupying the site have been demolished and the foundation work is under way. It will have a ground area of 47,338 sq. ft. and with its 12 stories will give a usable floor area of approximately 560,000 sq. ft. The cost ranges from a million to a million and a half dollars. It will be erected for the National Biscuit Company, which when the new project is completed will have a total floor area of nearly 1,500,000 sq. ft.

Importance of Western Hemlock

The wood of Western hemlock has generally been considered an inferior one, says the Department of Agriculture, chiefly because of the prejudice created by the name, which has caused it to be identified with Eastern hemlock. Tests by the Forest Service, however, show it to have 88 per cent. the strength of Douglas fir—one of the country's chief construction timbers; in fact, it is often mixed with Douglas fir and used for the same purpose.

The wood is practically free from pitch, has a handsome grain, takes paint and stain well, and works smoothly. It is suitable for sash and door stock, furniture, interior finish, framing, flooring, boxes, barrels and pulp. In bridges and trestles it can be used for all but the heaviest construction. When properly treated with preservatives, it is a valuable crosstie and pole wood.

According to Forest Service Bulletin 115 the best stands of Western hemlock are found in the coast region and through the Cascade Mountains. The bulletin further gives the results of tests by which the mechanical properties of Western hemlock have been determined, and tells of the different uses to which the wood is adapted.

Officers Master Painters' Association

The officers elected at the annual convention of the National Association of Master Painters, held in Denver, Colo., in February, were as follows:

President.....John M. Stiles, of Chicago.

Vice-Pres...W. E. Wall, of Somerville, Mass.

Sec.-Treas...Joe Kennedy, of Cincinnati, O.

It was decided to hold the next convention in the city of Indianapolis.

A very successful and satisfactory joint meeting and dinner of representatives of the Boston Society of Architects and of the Master Builders of that city was held on the evening of March 4, when a large number of architects and builders were present. The Joint Advisory Committee which has been at work for a year made an extended report, and this was ordered printed for distribution pending a future meeting for final action.

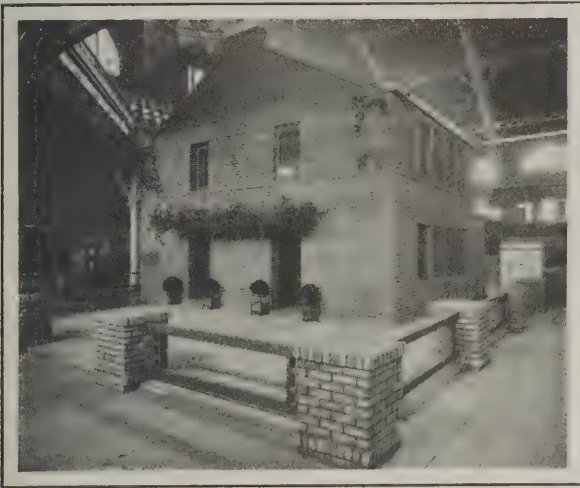
An exhibition which is to be along purely educational lines and designed to give every visitor a definite idea what the various suburbs about New York have to offer, will open in the Grand Central Palace on May 3. It will be known as the Real Estate Show and in addition to the real estate exhibits there will be models of practically every type of construction from the portable house to the more elaborate buildings.

THE SECOND ANNUAL CLAY-PRODUCTS EXPOSITION

A Prize Brick Cottage Containing Six Rooms One of the Many Features—
Exhibits of an Educational and Architectural Nature

HUNDREDS and thousands of brick of all sizes and shapes were necessary to make up the setting of the show in the aisles and avenues on which bordered the 150 exhibits, all separated from each other by decorative garden wall and ornamented by fireplaces and other architectural studies at the Second Annual Clay-Products Exposition held at the Coliseum in the City of Chicago from February 26 to March 8.

Especially from an educational and architectural



General View of the Prize Brick Cottage at the Clay Products Exposition

standpoint was the show attractive. Being only the second time the exposition has been held, no expense or trouble was spared to make everything a complete success. By judicious advertising and other methods of publicity large crowds were always in attendance at the exhibition, this feature largely compensating those intimately concerned in the welfare of the display.

Many unique exhibits were to be seen, among which was a completely furnished house built entirely of brick. It had been fully intended to build this house of bricks that had been received through the parcel post, but the scheme was abandoned on account of the shortage of bricks. However, several thousand bricks were received by parcel post from points as far west as Los Angeles, and as far south as Tuskegee, Ala., and these were utilized in building a high wall—probably the only wall in the world built entirely of bricks sent by parcel post.

The entrance to the exhibition was decorated and built in the form of brick-paved avenue and pergola. This was attractively displayed and an artistic finish was in the form of lily pond and fountain in the center of the aisle.

The brick house, reproduced herewith, was the chief object of attraction. One of the special messages from this demonstration concerned the possibilities of erecting a fire-resisting home at a low cost. Its permanency, cheapness and general satisfaction were emphasized, it being claimed that brick is superior and cheaper in the long run, and that its construction ensures good health and a saving of repair bills.

The house contained six rooms—one large living-room and kitchen downstairs, and three bed-rooms upstairs, including a bath-room. Each room was adequately furnished and the walls carefully papered.

A view in the kitchen is shown among our pictures. A competition was held in connection with this cottage, the winner to be the person who could guess the number of marbles in a jar and who was to be presented with an exact replica of the house on view.

Visitors were also entertained by the Art Institute of Chicago, a class in clay modeling being held every day throughout the entire exhibition. The old process of turning vases and other clay productions was also presented, together with many unique forms of attraction too numerous to mention.

Among the most important and attractive exhibits to be seen was that of the W. S. Dickey Clay Manufacturing Co., Kansas City, Mo., which commanded great attention, the booth being continually crowded with information seekers. A view of it is given herewith showing two types of chimney at the rear and a column of sewer pipe 36 in. at the base and 18 in. at the top.

The advisability of building chimneys with a lining composed of Dickey fire clay was clearly demonstrated, it being claimed the lining formed a double wall, thereby preventing moisture or rain penetrating the chimney. A house-drainage installation was fitted up in the booth, together with an attractive descriptive display in the form of photographs and literature concerning the sewer-pipe soil-saving dam that has been adapted especially for farm use. Instances of the capabilities of this system were freely given by G. H. Tefft who commanded the exhibit.

A complete model of a sub-division to be constructed throughout of "Denison" tile was the main feature to be seen at the exhibit of the Denison Fire-Proofing Co., Mason City, Iowa.

As seen in the picture on the next page, the tile is of novel construction. A wall constructed of this tile



View in the Kitchen of the Prize Brick Cottage

is in reality a double wall, each unit being a hollow wall in itself and the two units tied together with burned clay, forming another hollow unit, the tile being integral in the units formed. By actual test it has been known to stand over 140,000 lb. pressure per square foot of bearing surface. Drain and silo tile was also displayed, and all explanations were forthcoming from William E. Wilson, exhibit manager.

The International Clay-Products Bureau had an attractive display in the form of a pergola built of

drain tile supplied by different manufacturers. The formation of sanitary glazed sewer pipe was shown in its various stages from the slabs of rough clay, then to its powdered form, thence to its molded form, both green and dry, then baked and lastly the finished glazed article ready for use. An interesting part of the exhibit was a jar containing a piece of concrete pipe and also a piece of vitrified salt-glazed sewer pipe. These were submerged in a 10 per cent. solution of sulphuric acid. The action of the acid on the



Clay Products Exposition—Display of the Denison Tile Made by the Denison Fireproofing Co.

concrete pipe was a revelation to many visitors to the booth inasmuch as the concrete was being rapidly destroyed and the clay pipe being unaffected. The general campaign of the bureau showed the vast superiority of clay pipe in sewer construction. Two pipes were shown, having been in use for 31 years in Kansas City, Mo. The clay pipe was intact entirely but the concrete pipe had been disintegrated by the sulphuric acid formed in the sewer by the action of the sewer gas. Benjamin Brooks, an engineer of Kansas City, Mo., was the chief dispenser of information.

The Robinson Clay-Products Co., Akron, Ohio, had a large variety of vitrified sewer pipe and drain pipe on show. Another notable feature of the exhibit was a small kiln showing the operation of burning the clay. Visitors were also attracted by being shown the old method of turning. Many vases of varied sizes and shapes were cleverly turned out by one of the exhibitors. The N. A. Williams Co., Chicago, Ill., were the sole distributors and W. A. Humphries, general manager, had charge of the display.

The display of the Hydraulic Press Brick Co., Chicago, Ill., was specially noticeable on account of the harmonious and attractive way the booth was built up of the different colored and classes of brick manufactured by this concern. Each section of the booth was displayed to advantage with smooth and rough brick, white and green glazed brick giving a pleasing finish. B. T. Wheeler was busy handing out literature and information.

Chicagoans were much interested on viewing a reduced model of the proposed subway to be built, it is hoped, in the near future. This was erected from standard plans approved by the Harbor and Subway Commission.

The "Made in Iowa" exhibit was one of the largest and most diversified to be seen. All products displayed were of Iowan manufacture and included drain tile, vitrified sewer pipe, a silo of partial construction, self-supporting tile roof and other building material of importance.

The National Paving Brick Manufacturers Associa-

tion had an exceptionally large booth, in which they carried on an educational campaign concerning brick roads and streets. A number of photographs showed the working steps in the construction of a vitrified brick highway, the remarks printed thereon emphasized the absolute superiority of such sanitary roads. Part of the exhibit was given over to the display of a brick pavement showing it in its various stages of construction. It first showed the concrete foundation ready for sand cushion and lastly the pavement complete with its cement-filled joints.

"Natco" hollow tile was largely shown in the exhibit of the National Fire-Proofing Co., Chicago, Ill. A model of a completely fireproof house was displayed to advantage, the construction being of hollow tile and one-fourth the actual size of the average residence. Other displays showed the effect of a stucco finish on such tile and the methods employed for the attaching of plate rail, picture molding and baseboard. H. K. Weld was in charge of the booth.

It was the general opinion of visitors that the exposition was a complete success and manufacturers were in most cases gratified by the unusual interest displayed by the public in their products.

A Motor Truck for Moving a Cottage

A five-room cottage was moved for a distance of several miles by means of a motor truck in Los Angeles recently. It progressed through the streets at a much livelier gait than is usually taken by a moving house. The cottage was placed upon trucks with iron wheels, and a block and tackle was attached securely to the front of the building. About a thousand feet of wire cable was used to tow it, one end of which was fastened to the base of any convenient tree or telephone post about a thousand feet ahead. The other end of the cable was passed through the pulley and hooked to the rear of the motor truck, which brought it along a cable length at a time. By this method rapid progress was made. It was found necessary to load twenty or



Display of the W. S. Dickey Clay Mfg. Co.

more sacks of ballast over the rear wheels of the truck to make traction, and it was also essential to keep the radiator filled with cool water whenever it showed a tendency to heat and boil over.

INTERPRETATION OF BUILDING CONTRACTS

Rules Governing Judicial Interpretation—When Provisions Are Implied—Amounts Recoverable for Breach

By A. L. H. STREET



Of the many different classes of contracts which are made every day, few require more detailed or voluminous statement than building contracts. It is, therefore, not strange that their interpretation should involve many disputes which find their way into the courts, and myriads more which are adjusted without litigation. Below the writer submits a statement of several important legal principles which are frequently applied by the American courts in controversies of this kind. The observations may serve to emphasize the value to the building trades of evolving and adhering to set forms to cover different phases of contracts, where those forms have stood the test of experience and litigation.

Building contracts are governed by the principle of law, applicable to agreements in general, that in construing a contract effect must be given to every provision, if possible, whether all the provisions be embodied in one instrument or several. Hence, plans and specifications annexed to a contract, or referred therein, are to be deemed as much a part of the entire agreement as if they had been embodied in a single instrument. But, as decided by the Illinois Supreme Court, if there exists a discrepancy between the plans attached to a contract and those upon which the contractor bid, the owner cannot take advantage of such discrepancies to the builder's prejudice. And, subject to observations made by the writer in a recent article in *The Building Age* on the subject of Discrepancies, it may be said, as a general rule, that provisions in the contract control over conflicting clauses in the specifications, and that the specifications, in turn, control the plans.

Law Governing Agreements

Another rule of law governing agreements in general, which extends to building contracts, is the principle that whatever provisions may be fairly implied from the wording of an agreement are generally deemed to be covered as effectually as if they had been expressly stated. Thus, of necessity, a contract for the erection or repair of a building implies the owner's assent to the contractor's procurement of such materials and the employment of such subcontractors and employees as are required to complete the work. But the United States Circuit Court of Appeals has held that a contract cannot be construed to make the supervising architect's decision on a disputed question conclusive, unless such provision appears in express terms; that it cannot be raised by mere implication. If the contract does not specify how windows shall be placed, it will be deemed to require that they be installed in a workmanlike manner. On the other hand, according to a decision of the Missouri Supreme Court, provision in a contract requiring the construction of a building in a good and workmanlike manner, or in the very best manner, cannot be regarded as requiring the contractor to erect a pier or place an iron column under the end of a girder, not otherwise contemplated by the contract.

If, on reading a contract, doubt exists as to what was understood between the parties on a particular point, the agreement must be construed against the party who drew the instrument; as where an agreement contained the provision, "The foundations and the brick walls now standing that were uninjured by the fire will remain and be carried up to the height designated on the plan by new work." In another case it was decided that a contractor was not entitled to an allowance for alterations made without securing the architect's decision, where the contract provided that the architect should decide whether alterations asked for by the owner were within its terms, if the contractor knew that the owner understood that the alterations asked for were within the terms of the contract.

Particular Clauses Construed

That a contract provided for the doing of extra work has been held by the Iowa Supreme Court not to preclude the owner from making an independent contract with a subcontractor for such work. A clause requiring part of work to be finished in "San Domingo mahogany" was construed by the Supreme Court of Missouri as permitting the builder to use any good figured mahogany of the density of that grown in San Domingo, according to a local understanding in the building trades as to the meaning of the quoted term. Under a decision of the Connecticut Supreme Court of Errors, an agreement for the installation of plumbing in a dwelling house, requiring the plumber "to properly connect tank, boiler, range, wash trays, butler's sink, and bath tub with galvanized pipe with hot and cold water," did not require a circulation pipe for the hot water. When a New York building contract was entered into, it was contemplated by the parties that the wall of an old building should serve as a shoring support while the columns were being set in a new building, but, in the progress of the work, it developed that the wall was insufficient for that purpose. In this situation the New York Supreme Court held that work in furnishing and setting necessary shoring beams was not covered by the contract, and that the contractor was entitled to an extra allowance therefor. An owner was upheld by the Washington Supreme Court in construing his contract as requiring three coats of plaster on the walls of the building covered by the agreement, where the contract provided that the lathing should receive two coats of plaster and "carpet float for calimining walls," and authorized the owner to construe the terms of the agreement and make his construction final.

One of the most difficult phases of building contracts frequently involved in judicial construction, arises from provisions for the payment of fixed amounts as damages for breach of a contract. The law regards such provision as being one either for the payment of a "penalty," or as "liquidated damages." The distinction between these terms determines whether the sum agreed to be paid shall be deemed a debt and subject to enforcement for the agreed amount, in which case the amount is treated as "liquidated damages," or whether it shall be disregarded and the injured party's recovery be limited to the amount of damages actually sustained by him. As a general rule, the intention of the parties on this point is controlling, regardless of

whether the contract designates the agreed amount as being "liquidated damages," a "penalty," or a "penal sum"; and it may be said that, ordinarily, the sum fixed in the contract will be deemed "liquidated damages" and fully recoverable, where the actual amount of the damages is uncertain and not susceptible to definite ascertainment, and where the amount agreed upon is not, on the face of the contract, out of all proportion to the probable loss. On the other hand, if the stipulated amount appears to be disproportionate to the actual damages sustained, or if they can be definitely ascertained the agreed amount will be disregarded as constituting a "penalty."

Evolution of Sheet Metal

In the early sixties, sheet metal as a building material, except as a roof covering, was comparatively little used, although its actual beginning was probably twenty years previous to that. It seems now to be impossible to obtain any authentic account of its origin, although several stories concerning it are told. The progress of the cornice business seems to have been more rapid for some unaccountable reason through the Middle West than in the Eastern States, notwithstanding that the experts in the handling of the metal without doubt came from France and Belgium. This may have been in part because architects of the West were less scrupulous in the matter of imitation than those in the East, who practically considered it as architectural heresy, says a recent issue of *Sheet Metal*. Then, too, its progress may have been accelerated by the fact that wrought iron and steel construction were beginning to be introduced, which in itself entirely solved the problem of strength and support, leaving to sheet metal the work of supplying the external form or in other words carrying out the architectural design. Concerns for the manufacture of sheet metal work of this class, otherwise known as cornice shops, began to spring up throughout the country, among which those at Cincinnati, Dayton and Chicago may be particularly mentioned, and it is a matter of record that the first 8-ft. brake was made in Cincinnati in 1865 or 1867.

The erection of the buildings for the world's fair held in Fairmount Park, Philadelphia, in 1876, commonly known as the "Centennial," gave a great impetus to the sheet metal trade. Many of these buildings had, either wholly or in part, exteriors of sheet metal. What was known as the main building or Art Gallery, a building which is still standing, was built of stone, but much of the ornamentation was of stamped zinc applied to the friezes and other parts of the building, and the large skylight forming its dome was also of sheet metal.

Without reference to actual facts it can readily be deduced that with the advent of sheet metal architectural work, which had for its models the stone forms of ancient Greece and Rome as well as those of medieval times, it became an urgent necessity that the carved work always to be found in stone architecture should also be represented. This necessity became responsible for the ultimate invention of the now highly perfected machinery and methods for producing stamped zinc or copper ornamentation.

The new building of the David Ranken, Jr., School of Mechanical Trades, at Finney and Newstead avenues, St. Louis, Mo., was opened for public inspection the third week in February when examples of student work were on view and members of the board of trustees and the faculty of the school were present to receive visitors.

The World's Tallest Buildings

The practical completion of the sky-penetrating Woolworth Building renders more than usually interesting a statement of some of the other tall structures which are to be found in this and other countries. The twelve tallest structures include the following:

Pantheon, Rome.....	150 ft.
St. Isaac's, St. Petersburg.....	365 ft.
Statue of Liberty.....	305 ft.
Great Pyramid of Cheops.....	450 ft.
St. Peter's, Rome.....	400 ft.
Rouen Cathedral.....	490 ft.
Cologne Cathedral.....	516 ft.
Washington Monument.....	555 ft. 5 1/2 in.
Singer Building, New York.....	612 ft. 1 in.
Metropolitan Tower, New York.....	700 ft. 3 in.
Woolworth Building, New York.....	750 ft.
Eiffel Tower, Paris.....	984 ft.

If the 100-story skyscraper ever becomes an actuality the figures above noted will appear insignificant in comparison.

Silver Tarpon Shells Distributed to Roofers

A unique plan is now being used by the Auld & Conger Co., 1200 Prospect Street, Cleveland, Ohio, dealers in roofing slate and slaters' supplies, to attract the attention of roofers to its Mammoth Vein Poultney Sea Green, Purple Vein, Genuine Bangor Union and Genuine Bangor Ribbon brands of roofing slates. The plan being followed is the distribution of the scales of a silver tarpon, weighing 125 lb., which was caught on a light fishing line last winter by D. Auld, Jr., in Florida.

These shells are sent out, one to each roofer, as a somewhat interesting curiosity and as a sample of "roofing," with the statement that it has many points



Scale of Silver Tarpon

of interest in common with the brands of roofing slates named in the foregoing.

The scale received by *The Building Age* is reproduced in the accompanying illustration. The bright section of the scale, its natural color, was the only part "showing to the weather" while the dull portion was "lap" fully covered by the scales above.

The company states that while not in position to supply carload orders for this sample roofing, it can take care of regular roofing slate requirements promptly at all times. It also states that it has a few extra scales on hand, which it will pass out as long as they last to anyone sending postage.

Asphalt and Mastic Floors

An asphalt floor is said to give satisfactory service under wet, hard conditions if the material be properly selected and the work intelligently done. It is well to make sure that those laying such a floor are thoroughly competent and that they are paid on such a basis that they can give really first-class work.

A CONCRETE HOUSE WITH HOLLOW WALLS

A Construction Giving Practically One House Built Within Another
With a Continuous Dead Air Space Between Running
from Foundation to Ridge

WE present in the accompanying half-tone engraving a picture of a conveniently arranged dwelling constructed of concrete with hollow walls, thus establishing a dead air chamber from foundation to wall plate and continuous entirely around the building. The construction is such as to practically make one house within another, separated by a 2-in. dead air chamber.

The house has a frontage of 32 ft., a depth of 31 ft. and a height of 19 ft., with a cellar 7 ft. in the clear. The plans, which are also given upon this page, show the entrance in the center of the building which gives access to a reception hall. From it rises the main flight of stairs leading to the second story.

At the left of the hall as one enters is the dining room, $16\frac{1}{2} \times 14\frac{1}{2}$ ft. in size, and communicating with the kitchen in the rear through a commodious and well-equipped china closet. In the kitchen the sink is placed under the windows, where ample light is provided. In the rear entry is the refrigerator so placed

wall papers, electric light fixtures and a neat pattern of hardware.

The arrangement of the second floor is somewhat unique. In the front are two sleeping rooms with a sewing room between, and at the rear is the bath room. The master's room has an open fireplace and measures $13\frac{1}{2} \times 20$ ft. in size. A fourth bedroom is at the opposite corner of the house, while a linen closet opens off the hall and is convenient to the various sleeping rooms. The stairs are concentrated in the center of the building.

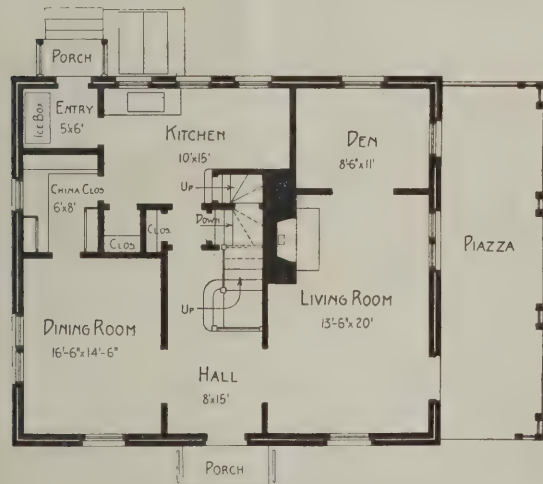
The floors throughout are beech and the finish of the bedrooms is white wood painted. The bath room has a sanitary Petrosilo floor. There is a large attic room for the storage of trunks.

The basement, which is enclosed with concrete foundation walls, has ample room for a heater, laundry, store room and other facilities.

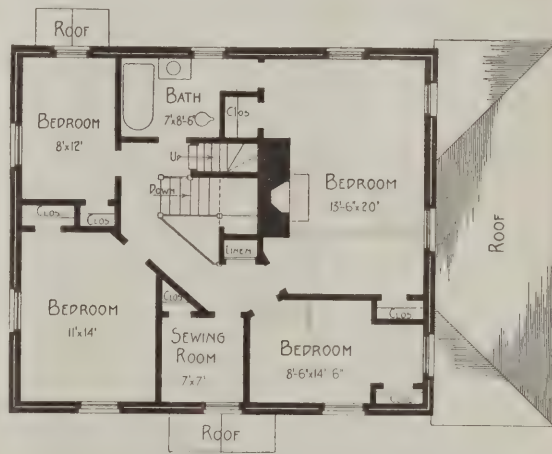
As intimated above, the house has exterior walls of hollow concrete construction, built by the use of the Van Guilder machine made by the Van Guilder Hollow



Perspective View of the House as Shown by a Photograph



First Floor—Scale 1/16 In. to the Foot



Second Floor—Scale 1/16 In. to the Foot

A Concrete House with Hollow Walls—Robert Coit, Architect, Boston, Mass.

as to be easily iced from the rear porch and without the necessity of the ice man entering the kitchen.

A rear flight of stairs rises from the kitchen and directly under this flight is the one leading down to the cellar. Opening out of the kitchen is also a closet for pots and kettles, and there is also a closet in the passage way between the front hall and the kitchen, and directly opposite the door leading to the cellar stairs.

At the right as one enters the house is a living room $13\frac{1}{2} \times 20$ ft. in size, and having a commodious open fireplace. Beyond is the den, $8\frac{1}{2} \times 11$ ft. in size, the entire arrangement being compact and admitting of an artistic handling of the problem. The rooms are finished in mahogany with beamed ceilings, attractive

Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y. The roof is covered with red asbestos shingles and this, with the white tinted stuccoed walls, lattice piazzas, terraces and brick walks, combine to make a most attractive exterior.

The house here shown was built for Everett A. White at Winchester, Mass., in accordance with plans prepared by Robert Coit, architect, 85 Water Street, Boston, Mass. The contract was executed by the F. O. White Construction Company, 183 River Street, Cambridge, Mass.

Wooden houses are unknown in Valencia, Spain, the buildings being for the most part of brick faced with plaster or artificial stone.

New Publications

The Design of Steel Mill Buildings and the Calculation of Stresses in Framed Structures.—By Milo S. Ketchum, C. E.; 556 pages. Size 6¼ x 9 in. Profusely illustrated. Bound in board covers. Published by McGraw-Hill Book Company. Price \$4.

This is the third edition, greatly enlarged, of a work intended to provide a short course in the calculation of stresses in framed structures and to give a brief discussion of mill building construction. It is intended to supplement the elementary books on stresses on the one hand, and the more elaborate treatises on bridge design on the other. While the book is concerned chiefly with mill buildings much of the matter will apply equally well to all classes of steel frame construction. In the courses in stresses both the algebraic and graphic methods of calculation are illustrated and described. Each step in the solution is fully explained and analyzed so that the student will derive a definite idea of the underlying principles. In the discussion of mill building construction there is a brief treatment of mill building design, the making of estimates of weight and cost, together with a description of the methods of construction and the material used. The main idea has been to give methods, data and details not ordinarily available and to discuss the matter presented in a way to assist the engineer in making his designs and the detailer in developing the designs in the drafting room.

In this the third edition the chapters on "Stresses in Framed Structures" and "Stresses in Bridge Trusses" have been rewritten and enlarged, and the "Specifications for Steel Frame Buildings" have been revised. The additions include two problems in graphic statics and an appendix, "Structural Drawings, Estimates and Designs" which contain 78 pages, 30 tables and 24 illustrations, and furnish data with many tables not readily available. The number of pages in this edition has been increased by 82 and the number of illustrations by 30.

Part three will appeal more especially to progressive readers of *The Building Age*, as it treats on Roof Trusses of various types, their pitch and economic spacing; Saw Tooth Roofs and Mill Building Columns. There are chapters on Corrugated Steel; Roof Coverings; Side Walls and Masonry Walls; Foundations, giving the bearing power of soils and piles with the pressure of wall and pier on foundation; Floors of various types and materials; Windows and Skylights; Ventilators; Doors; Shop Drawings and Rules; Paints and Painting, and Estimate of Weight and Cost.

Book of Standards, 1913 Edition; 560 pages. Size 4¼ x 6¾ in. Bound in leather covers, pocket book form. Issued by the National Tube Company. Price \$2.00.

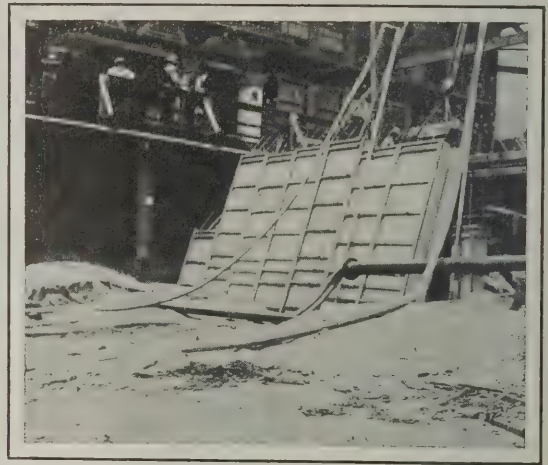
The present edition of this book of standards, which is the first since the 1902 edition, contains a vast fund of information in regard to tubular products and will be found of special interest to the engineer and the architect. A feature of special value is an article covering pipe used as columns and accompanied by tables showing the use of standard, extra strong, double extra strong pipe based on the New York Building Code, as well as the Chicago Building Ordinances. Considerable prominence is given to articles on strength of tubes and cylinders under internal fluid pressure and collapsing pressures; also to the mechanical properties of solid and tubular beams of usual and unusual shapes. A large collection of tables in conjunction with explanatory articles are to be found together with a number of pages giving weights, dimensions, threads per inch, test pressures, sections of joints, specifica-

tions, etc., of various kinds of pipes and tubings made. There is also a glossary of terms used in the pipe and fittings trade, and the metric system is included with conversion methods for most of the more commonly used measures, including temperatures.

The preparation of this book consumed nearly four years and represents a great deal of research and experimental work. It cannot fail to prove a valuable addition to the library of the architect, the contractor and the engineer.

Interlocking Concrete Piles

What are said to be the first interlocking concrete rectangular piles to be used in ocean-pier building on the American coast are being driven at Venice, Cal., a resort distant 15 miles from Los Angeles. A pleasure pier is being extended into the ocean 1,000 ft. with a width of 225 ft. and all of reinforced concrete. The superstructures also are to be of this enduring material. The picture presented herewith shows



General View of Interlocking Concrete Piles

how the piles interlock and their appearance as they sink by their own weight into the sand as it is loosened by jets of water pumped from the surf. The piles are encased in sheet steel which is expected to wear away in the course of time, leaving a solid wall of well hardened concrete. No falsework is used in the construction of the pier. Construction members are made for succeeding sections on those already built and are elevated into place by a giant turn-table crane.

Commencement Exercises, Thaddeus Stevens Industrial School

The first commencement exercises of the Thaddeus Stevens Industrial School of Pennsylvania, which is located in Lancaster, will be held on Friday, March 28, when a class of 23 students will be graduated. The class will consist of six carpenters, six bricklayers, six pattern makers and five machinists.

The instruction at this institution has been arranged to give a thorough knowledge of the theory and practice in each trade, together with the ability to make and read drawings pertaining thereto, particular emphasis being placed on the practical part of the work. The trade courses cover a period of three years.

The latest thing in shingles is made of cement mixed with cotton fiber and which are applied the same as wooden shingles. Nails will drive through them readily without damage to the shingle, the hole closing tightly about the nail. To insure against leaks a large tin washer is used in connection with the nails.

WHAT BUILDERS ARE DOING

Bird's-Eye View of Building Situation in Leading Cities—Estimated Value of the Projected Improvements

THE feature of the building operations in the city of Baltimore, Md., last month was the number of brick dwellings for which permits were issued, these calling for fully half of the total estimated cost of improvements for which permits were issued in February. The new work planned was valued at \$524,234, and there were 531 alterations costing \$58,000 and 80 additions costing \$74,000.

There were 200 brick dwellings planned estimated to cost \$303,700 of which 196 were two stories in height and estimated to cost \$255,000.

Buffalo, N. Y.

Building permits for the month of February totaled 173, with an estimated valuation of \$347,000, as compared with 204 permits, \$478,000 valuation for January, 1913, and 121 permits with a valuation of \$1,228,000 for February, 1912.

Architects have a large amount of new work in preparation and the probabilities are that the succeeding spring months will show much larger totals than February. The permits issued for that month cover quite a number of important buildings, among which are the following: A church edifice for the congregation of the Church of the Assumption R. C. at Amherst street and Reservation avenue, to cost \$75,000; a social center building, stone and brick, for the Jewish Federation of Buffalo at Jefferson and High streets, to cost \$40,000; a clubhouse on Amherst street for the Buffalo Polish Club, from plans of Architect W. H. Zawadzki, 798 Fillmore avenue, \$20,000; a clubhouse and hall for the Polish Union, William and Detroit streets; office building, 60 x 120 ft. for Taylor & Crate; office building for the Inland Seas Realty Company, Pearl street, and store and office building at William and Sherman streets for Henry Daff, from plans of Architect Joseph Geigans; store building, 60 x 125 ft., at Seneca and Cazenovia streets, brick and steel, \$25,000; substation exchange building for the New York Telephone Company, from plans of Architects McKenzie, Voorhees & Gmelin, New York City; addition to transformer station of the Cataract Power & Conduit Company; laboratory and office building for Spencer Kellogg & Sons; bottling works for the Gerhard Lang Brewing Company, \$20,000; boiler house for the International Brewing Company; foundry for the King Sewing Machine Company, \$35,000; machine shop, boiler works and office building for the J. P. Devine Company, manufacturers of vacuum drying apparatus, Clinton street and the Erie Railroad, \$60,000; coopeage building and oil compounding plant for the Upson Oil Company, Broadway and West Shore Railroad, and an addition to the beam shop of the George Kellogg Structural Steel Company, Pennsylvania Railroad and Lord street.

Contract for construction of the Hutchison High School building, at Johnson Park and Elmwood avenue, have been let to the Duroolithic Company, Buffalo, at \$705,000 and work will be commenced at once. Contract has also been awarded for the construction of a meter and valve house for the new waterworks pumping station at the foot of Porter avenue, same going to the Bison Construction Company at its bid of \$155,182.

Plans are in preparation by Architect Carl Schmill, Prudential Building, for a new church edifice and school building for the congregation of the Church of the Sacred Heart R. C. to be erected at Emslie and Watson streets at a cost of \$200,000.

Chicago, Ill.

The building record for February shows a continuance of prosperous conditions and an exceptionally large increase over the same month of the previous year. This can also be said of the year to date, figures for 1913 showing an increase of 50 per cent. over the same period of the past year.

There were 495 permits for buildings issued last month, occupying 16,222 ft. frontage and estimated to cost \$4,668,-

600. The same month last year produced 445 permits, consuming 12,332 ft. at a cost of \$3,777,100.

Total permits for the two months of the year were 971, frontage 31,998 ft. and cost \$11,570,900, while in January and February, 1912, there were 867 permits with 21,140 ft. frontage and a cost of \$5,776,400.

The Schulze Baking Company will erect an immense bakery in the early spring, to be ready for occupancy in November of this year. It will be five stories in height, with dimensions of 170 x 360 ft., and will cost \$250,000. The facings will be of white enamel tiling.

A new building to be known as the Continental is to be erected on the southeast corner of Fifth avenue and West Quincy street. It will front 55 ft. on South Fifth avenue and 54 ft. on West Quincy street. The height is to be ten stories, with an estimated cost of \$250,000. The exterior is planned to be of stone and brick, with an entrance of marble and mosaic. D. H. Burnham & Co., architects.

A new addition in the automobile district will be a six-story and basement fireproof building to be occupied by the Beckley-Ralston Company. Holabird & Roche are planning the building, the cost of which will be \$150,000.

The Plastering Contractors' Association of Chicago held a "smoker" at their club rooms on North Clark street February 15. The membership now consists of 65 and the association is growing rapidly. An interesting address was made by Oscar A. Reum, of the Zander-Reum Company.

Cincinnati, Ohio

Compared with January, of this year, February makes what might be taken as a poor record. During January 847 permits were issued, having a total valuation of \$946,962, while in February 737 permits were taken out, with estimated value for improvements placed at \$346,832. This can be accounted for by reason of the fact that the foregoing records include elevator inspections, and more of these were issued in January than during the following month. The discrepancy in the amount of improvements planned is also explained by the issuance in January of a permit covering a nine-story building for the Bell Telephone Company.

In February, 1912, there were 438 permits issued for buildings valued at \$390,324. Although one large factory building was included in this month's report, the larger part of the amount was for residence construction.

The outlook for a very busy spring season is excellent, and with open weather during the next few months, the first half of 1913 will doubtless exceed the same period of 1912, especially as far as residence building is concerned.

Cleveland, Ohio

A large amount of new building work is coming out in this city. During February there were 490 permits issued by the City Building Inspector's Office for new buildings, additions and alterations aggregating \$1,142,725. This is almost equal in amount to the combined permits of February of last year and two years ago. Building contractors already have considerable work on hand for the coming season and a large amount of other work is being figured on. This includes moderate-sized office buildings, store rooms, factories and residences.

The largest new project that came during the month was the city group of hospital buildings, for which an expenditure of about \$2,000,000 is planned. Bids have been received for these buildings and it is the intention to start the work in a short time.

Los Angeles, Cal.

Buildings for which permits were issued in February were valued in the aggregate at \$1,676,000, compared with \$2,152,963 for February, 1912. The number of permits issued was 1210, compared with 1390 for the previous month. Notwithstanding the drop in the valuation based on permits, figuring has been unusually active, and many contracts of some importance are now being let, indicating

much greater activity with the approach of summer. There is a considerable volume of work at present in the remodeling and improvement of stores and offices in old buildings. The March record will be swelled by the \$1,000,000 nine-story Broadway Department Store, application having been made for a permit for this work. Application has also been made for a permit for the men's dormitory of the Los Angeles Bible Institute, a thirteen-story building with 350 rooms.

The principal buildings to be figured in the near future are: A 200-room hotel, reinforced concrete with red tapestry brick facing, on West Sixth street, between St. Paul and Loomis streets, to cost about \$500,000, Parkinson & Bergstrom, architects; an eight-story Class A loft building for Isaacs Bros., on Broadway near Eighth street; the new Southern Pacific passenger station which, including track accessories, will cost about \$750,000; a twelve-story bank and office building at Sixth and Spring streets, William Curlett & Son, architects, and a ten-story concrete hotel at Main and Franklin streets, to cost about \$500,000, Dennis & Farwell, architects.

Among the more important jobs reported in suburban towns may be mentioned the following: the Pasadena high school group, contract let to William C. Crowell at \$398,920; two-story brick building at Santa Ana high school, let to David Irvine at \$36,000; another building for the same school, let to George Condon at \$57,000, and a three-story Class C theater at Ocean Park, let to Alta Planing Mill Company at \$32,000.

Owing to the rapid growth of the local Builders' Exchange, it has been necessary to secure larger quarters. The Exchange is now located on the fifth floor of the Stimson Building, Third and Spring streets.

Louisville, Ky.

The report of Building Inspector Robert J. Tilford for February shows that building improvements estimated to cost \$547,809 were planned, while the estimated cost of buildings for which permits were issued in February, 1912, was \$999,680. Of this latter amount \$881,680 was the estimated cost of the permit issued for the erection of the city hospital. Eliminating this from the total, last month's figures would show an increase over February a year ago of \$429,809.

Milwaukee, Wis.

The very favorable weather which has prevailed during the winter has helped building operations in many ways and during the month just closed there were 119 permits taken out for construction work representing an aggregate cost of \$492,736. In February a year ago there were only 90 permits issued, but the aggregate cost was 403,026.

Montreal, Canada

At the annual meeting of the Montreal Builders' Exchange reports were presented showing the year just closed to have been the greatest in the history of the city from the standpoint of extensive and valuable building operations. The election of officers for the ensuing year resulted in the following choice:

President.....Joseph Brunet
First Vice-President.....Thomas Gilday
Second Vice-President.....Frank Pauze
Secretary.....R. L. Werry

The past year was one of the best in the history of the Exchange.

New York City

It is fair to assume that the very favorable weather conditions recently prevailing were among the causes of stimulating building operations in February as represented by the figures covering the leading boroughs of Greater New York. In Manhattan especially the amount of vested capital involved in the new construction work projected last month was decidedly ahead of the same month a year ago, although the number of buildings planned were a trifle less than those in February, 1912.

According to the report of Superintendent R. P. Miller there were issued last month permits for 49 new buildings to cost \$8,542,575, while in February last year 54 new buildings were planned to cost \$5,751,700. This condition was brought about by the increase in tenement house construction, store and loft buildings, schoolhouses and churches. Last month there were 11 tenement houses planned to cost \$1,347,200, against 10 similar structures in February a year ago estimated to cost \$713,000. Of store and loft buildings there were 8 planned last month to cost \$6,155,000 as against 15 in February last year to cost \$3,108,000. To last month's figures must be added \$617,960 for alterations and in February a year ago \$1,225,946.

The most important buildings for which plans were filed were the Lord & Taylor 10-story store at the corner of Fifth avenue and 38th street, costing \$2,000,000; a 6-story

apartment house at the corner of Fort Washington avenue and 161st street, costing \$275,000; the 1 and 2-story West-Park Presbyterian Church at 611 to 617 West 174th street, at a cost of \$150,000; the 8-story Women's University Club house at 106 and 108 East 52nd street, to cost \$130,000; a 12-story loft building at 423 to 437 West 55th street, at a cost of \$600,000; a 13-story store and lofts at 131 to 137 West 35th street, at a cost of \$300,000; an 8-story apartment house costing \$300,000 at 106 to 110 East 53rd street, and a 12-story brick warehouse at 501 to 509 West 36th street, at a cost of \$650,000.

In the Bronx there was an appreciable increase last month in the new work planned as compared with a year ago, the figures being \$2,422,185 and \$1,987,840 respectively.

In Brooklyn permits were issued by Superintendent P. J. Carlin for 269 new buildings to cost \$2,100,525 with permits for alterations to 406 buildings to cost \$194,325, giving a total of \$2,294,850.

In February last year permits were issued for 255 new buildings costing \$1,680,405 and for alterations amounting to \$214,062, giving a total of \$1,894,467.

Philadelphia, Pa.

Unfavorable weather conditions during February restricted contemplated building operations to a considerable extent. Had the same conditions prevailed as during January there is little doubt but that actual operations would have been much larger, as builders had a large amount of new work in contemplation. Notwithstanding poor weather, some branches of the trade showed material gain over that begun in February of last year.

Statistics compiled by the Bureau of Building Inspection show that 599 permits, covering 756 operations, costing approximately \$1,414,645, were issued, as compared to 520 permits for 795 operations at an estimated cost of \$2,029,385 in the same month last year. February, with a shorter number of working days, compares favorably with January, in that expenditures for the latter month aggregated but \$1,566,740. Two-story dwelling operations in the past month included 136 buildings, costing approximately \$373,425 as compared to an authorized expenditure of \$352,100 in January. A moderate gain was also shown in three-story dwelling operations. Manufacturing buildings and warehouses showed a decline, while garages showed a marked falling off in expenditure, although the number of individual operations was larger. No permits were taken out for municipal buildings. Additions to existing buildings made a sharp gain, permits for work aggregating \$415,434 being taken out in February, as compared to \$124,325 during January. A number of large operations, on which excavation work has been under way during February, were not included in building permits issued, but will be carried over into the statistics for March. One large operation of this character is the new Metropolitan Building, which will cost about \$500,000.

The general outlook for building work during the spring months is considered decidedly favorable. Dwelling house plans already being estimated on, call for a large amount of work. There is also a good volume of new operation work in office buildings of large size, as well as considerable commercial building work. Several local industrial plants have extensive plans under way for the erection of large plants in the suburban districts. Dwelling house operations in the suburbs also promise exceedingly good business, in which local builders figure extensively.

Labor in the building trades continues well employed and prospects are very bright for an active year.

L. R. Ayre has acquired two plots of ground on Hadfield street, near the Cobbs Creek Parkway, on which it is proposed to erect forty-eight two-story houses.

Work has been started on the construction of 22 three-story houses 16.4 x 52.6 ft., by E. S. Radley, on Fifteenth street north of Lindley avenue. The operation will cost about \$120,000.

The Aberthaw Construction Company, of Boston, Mass., is understood to have been given the contract for the erection of the new Larkin & Co. building at 23d and Arch streets. The building will have a height of 200 ft. above the street level and will be twelve stories high. Ballenger and Perrot are the engineers.

Jacob Grow is reported to have taken title to a plot of ground at 57th street and Washington avenue and adjacent streets, on which it is planned to erect 26 houses.

E. Allen Wilson, architect, has prepared plans recently for a large number of dwelling house operations. These include twenty-four two- and three-story houses to be built by H. P. Anderson at 61st and Christian streets, also plans for 16 dwellings and stores to be built at 59th and Elsworth streets by Ferguson & McDowell and several other large operations. Plans are now being prepared by the architect for an operation of 36 houses to be erected in the vicinity of Logan Station.

Plans are in progress by Stewartson & Page, architects.

for a new dormitory to be erected for the University of Pennsylvania at 36th and Spruce streets. The building will be four stories, of brick, concrete and hollow tile.

The Pennsylvania Railroad has awarded a contract to M. R. Rhodes, Chambersburg, Pa., for the erection of a passenger station and sheds at that place. The building will be 63 x 112 ft., one-story, of brick and terra cotta.

The Harrison C. Rea Company has taken out permits for the construction of the Metropolitan Building, under construction for the Metropolitan Realty Company, at Broad, Wallace and 15th streets. Charles Balderston was the architect.

Pittsburgh, Pa.

The February report of the city building inspector shows 195 permits to have been issued for building improvements estimated to cost \$769,161, while in February, 1912, there were 206 permits issued for buildings estimated to cost \$362,147.

Of the permits issued last month 59 were for new buildings, the estimated cost of which is placed at \$363,975. Permits for alterations were 110 in number and the cost was \$361,491. Of the new buildings authorized 28 were brick, 18 were brick veneer, 11 were frame and one was cement.

Portland, Ore.

After a month of activity, the building situation has dropped back to about the same quiet condition as before the end of the year. The valuation of buildings for which permits were issued in February was \$735,685, compared with \$1,199,861 for February, 1912. There is a fair amount of work under way, however, and as weather conditions become more favorable for outside work a period of considerable activity is expected, as many plans are ready for figuring. The great majority of the permits issued were for dwellings of a desirable class, a great many being valued around \$5,000.

Among the principal buildings for which figures will be taken shortly are additions to the Peninsula and Weston schools, T. J. Jones, architect; a three-story brick hotel to cost \$490,000. Bennes & Hendricks, architects, a two-story concrete warehouse at E. First and E. Salmon streets, to cost \$35,000, Whitehouse & Foulhoux, architects; a 6-story concrete apartment house at Tenth and Lovejoy streets, to cost about \$165,000; a six-story concrete building at Tenth and Montgomery streets, to cost about \$125,000, Whitehouse & Foulhoux, architects; the concrete Weinhard Brewery at Eugene, Ore., architects, Vincent, Russell & Preusse; a four-story concrete apartment house at Tenth and Hall streets, to cost \$100,000, Claussen & Claussen, architects; and St. Mary's Hall, four-story brick, at Vancouver, B. C., Robert Tegen, this city, architect. The First Methodist Church has under consideration sketches of several architects for its \$150,000 building.

Reading, Pa.

At a meeting of the leading interests in the building industry an organization to be known as the Contractors' and Builders' Exchange was organized with officers for the ensuing year as follows:

President.....William A. Sharp
Vice-President.....George A. Koch
Treasurer.....Daniel H. Hunter
Secretary.....E. H. Keever

The object of the organization as briefly outlined by President Sharp is for the advancement of the mutual interests of business and trade connected with contracting and building. "It is not to be a detriment to organized labor," he said, "but to help to elevate it." Any individual of good repute whose vocation connects him with the trade or industries of building, is eligible to membership.

Sacramento, Cal.

It was hardly to be expected that the high building record of January would be maintained, but work is still coming out in very good shape for this time of year, and plans are under way for a number of fine blocks to be erected during the summer. Buildings for which permits were issued last month were valued at \$146,752, compared with \$415,398 for January, and \$104,465 for February of last year. Owing to lack of rain and uncertain crop outlook there is some tendency to delay, but a fair rainfall this month should bring a marked revival.

The State Board of Control has under consideration the construction of a ten-story office building to house the numerous state offices for which there is insufficient room in the Capitol.

Architects Lewis F. Hobart and Arthur Brown, of San Francisco and John Parkinson, of Los Angeles, named as a committee to pass on the 46 competitive plans submitted for a local school building, awarded the first prize to Architects Shea & Lofquist, of San Francisco. The estimated cost is \$180,000.

Thomas Day & Sons, contractors on the Libby, McNeill & Libby cannery, have over 100 men at work. Several thousand barrels of cement and over 500,000 ft. of lumber will be required in the work.

There is still considerable activity at other valley towns. Architect C. A. Meussdorffer, San Francisco, is preparing plans for the three-story Gottschalk department store at Fresno, to cost about \$300,000. At Modesto plans are about ready for three buildings aggregating \$120,000.

San Francisco, Cal.

The past month as a whole has been rather quiet, and is reflected in the February record of building permits, which was \$1,298,450, compared with \$2,062,001 for January, and \$1,764,252 for February, 1912. The greater part of the total is made up of small work, including a considerable number of small brick or concrete business buildings, though permanent apartments of moderate size are still an important feature.

The building material market remains very firm in all lines, though the strength is due rather to outside than to local demand. Local fabricators of structural steel are hardly able to compete for large jobs on which a time limit is set, and manufacturers of reinforcing material occasionally get a premium for prompt delivery. Common brick, though firm, is still quiet, and several plants are resuming work after the winter shutdown. The demand for pressed brick and terra cotta, as well as for stone, is improving, while cement and lime plants are beginning to find difficulty in filling orders, owing to the large demand for shipment. The controlling factors in the lumber market are the heavy demand for export and Eastern shipment, and the shortage of logs in the north, though dealers expect an enormous local business during the summer.

Plans for municipal and exposition buildings are rapidly taking form, and the ordinance has been passed ordering construction of the new city hall. Bids have been called for on the construction of the Education Building of the Exposition, which will cover an area 500 x 530 ft. It will be surmounted by a dome, the construction being of timber with staff and plaster exterior, though the walls facing the main court will be of concrete. Bliss & Faville are the architects. An extensive wood-working outfit has been set up on the site for the machinery building, so that practically no sawing or boring will be done by hand.

The General Contractors' Association of San Francisco is now settled in its new home in the Sharon Building on New Montgomery street, and the installation banquet was held at the headquarters on the evening of March 1. The new location includes a large floor with clubrooms and thirty finely equipped booths. The banquet was attended by a large assemblage of builders, architects and public officials.

The second annual convention of the Contractors' & Builders' Association of California was held in the Master Plumbers' Association Building February 27 to March 1, being attended by delegates of the various trades from all parts of the state. Special entertainment was given each evening, and the affair closed with a dinner at a downtown café. Frank J. Klimm, past president of the Master Plumbers, acting as toastmaster. The following officers were elected:

President.....J. E. Steere, of San Francisco.
First Vice-Pres.....W. S. Scoville, of Sacramento.
Second Vice-Pres...H. J. Hughes, of San Francisco.
Second Vice-Pres.....Chris Totten, of Stockton.
Secretary.....W. S. Scott, of San Francisco.
Treasurer....W. S. Hanbridge, of San Francisco.

One of the largest buildings for which contracts have recently been let is the Stewart Hotel annex, a seven-story Class A structure on Geary street near Mason, segregated contracts for which have been let to the amount of about \$80,000. Cunningham & Politeo are the architects.

Among the principal buildings on which figures will be taken are a one-story steel frame building, heavy enough to carry six more stories, at Mission and New Montgomery streets, to cost about \$100,000, Sylvain Schnittacher, architect; a three-story Class A addition to the Metropolitan Life Insurance Building at Pine and Stockton streets, to cost \$100,000, Miller & Colmesnil, architects; a six-story Class C apartment house on Sutter street near Mason, to cost about \$110,000, F. H. Meyer, architect; a seven-story concrete apartment house on Ellis street near Leavenworth, Salfeld & Kohlberg, architects, and a five-story Class C hotel at Eddy and Taylor streets, to cost about \$130,000, Henry H. Meyer, architect.

Seattle, Wash.

An increase in the value of various classes of buildings planned in February is responsible for the very favorable comparison which the figures for that month make with the corresponding period a year ago. The report of

Superintendent R. H. Ober shows that last month there were 777 permits issued for building improvements estimated to cost \$1,468,560, while in February last year practically the same number of permits were issued—775—but the estimated outlay was only \$473,940. In a measure this difference is made up by the planning of fireproof and semi-fireproof construction calling for an outlay of \$673,200 as contrasted with an estimated outlay of \$15,000 in February a year ago. There was also frame construction planned last month to the extent of \$637,420, while in February a year ago the estimated cost of this class of work was \$304,220. Detached residence construction involved the planning of 142 houses costing \$254,930 as against 154 houses estimated to cost \$229,710 in February a year ago.

For the first two months of the current year there were 1,366 permits issued for building to cost \$2,029,335 and in the corresponding period of 1912 there were 1,537 buildings planned to cost \$1,248,750.

St. Louis, Mo.

Building permits issued in February were more than double those for the corresponding month a year ago, this increase being due very largely to the permit for an office building involving an outlay of \$950,000. There was also a \$160,000 building planned for the St. Louis Children's Hospital. At the same time there was considerable more activity in brick dwelling construction in all parts of the city. It must be recalled, however, that a year ago in February the country was visited by exceedingly severe weather, which practically checked building operations.

Last month the estimated cost of new buildings planned was \$1,995,252 and \$126,441 was for alterations. In February a year ago the new construction work planned was estimated to cost \$869,140 and the alterations \$133,024.

Toledo, Ohio

A decided impetus was given to building operations last month when permits were taken out for improvements valued at \$406,208 as against \$236,917 in February a year ago. For the two months of the current year the total is \$718,186 as against \$351,352 for the same time in 1912.

A large attendance characterized the "Architects' Night,"

held by the Builders' Exchange of Toledo, O., on the evening of March 7. The exchange rooms were crowded with members and their architectural friends, the latter numbering about twenty. President L. E. Fishback welcomed the company and commented briefly on the relationship that should exist between the two branches in the building industry.

An address on "The Benefits of a Builders' Exchange to the Architect and the Builder," was made by Edward A. Roberts, of Cleveland, and an address on "The Relation of the Architect to the Builder" was made by Benjamin S. Hubbell, former president of the Cleveland Chapter American Institute of Architects. A speech of a rather humorous nature was made by C. T. Lawton, an attorney and former secretary of the Toledo exchange who discoursed upon "The Architect, Owner and Contractor." Following the meeting there was a social session with refreshments which everyone enjoyed.

Toronto, Canada

At the recent annual meeting of the Builders' Exchange of this city the following officers were elected for the ensuing year:

President.....Charles Bulley.
First Vice-Pres......George Oakley, Jr.
Second Vice-Pres......G. W. Britnell.
Secretary.....P. L. Fraser.
Treasurer.....John Aldridge.

Winnipeg, Canada

At the annual meeting of the Builders' Exchange the following officials were elected to serve for the ensuing year:

President.....W. J. Davidson
First Vice-Pres......F. Hinds.
Second Vice-Pres......J. McQuarrie.
Secretary.....A. M. Rose
Treasurer.....Thomas D. Robinson.

The report of the secretary showed the organization to be in a flourishing condition.

BUILDERS' APPLIANCES AND EQUIPMENT

Some Things of Seasonable Interest to Those Having
to Do with the Building Business

Improved Level for Contractors and Builders

The David White Company, 418 East Water street, Department B, Milwaukee, Wis., has just completed its new and improved level for 1913, the general appearance of which is shown in Fig. 1 of the engravings. The company desires to point out and particularly call the attention of the contractor and the builder to the fact that there has been incorporated into this improved model new and special features which cannot fail to prove of interest to them. These include among others longer

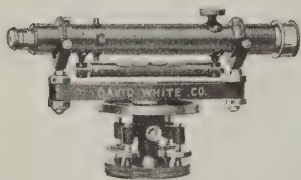


Fig. 1—Improved Level for Contractors and Builders

and more tapering centers that render the level less liable to become out of adjustment; improved locking device for the Y's, which dispenses with the old-fashioned pin-bolts; spiral motion to the eye-piece, which enables a more exact focusing to the cross-hairs, and long, powerful telescope with magnifying power 25

diameters, thus particularly adapting the instrument for use in running long levels.

House Warming of the T. L. Smith Company

The grand reunion and house warming incident to the formal opening of the new office building of the T. L. Smith Company at Milwaukee, Wis., on February 26 and 27, marked a very important event in the history of this pioneer concrete mixer company. The new building is

located across the street from its present shops, and the celebration took the form of a reunion of the out-of-town managers and agents who went to Milwaukee as the guests of the company, and while there were entertained in various pleasant ways. The mornings were taken up with trips through the several shops comprising the company's immense plant, these excursions being made as instructive as possible by demonstrating the various new machines, which will help keep this progressive company at the front during the year 1913.

During the noon hours the guests, including the department managers of the local offices, were treated to a splendid luncheon. Chief Engineer E. W. Meyer proved himself a splendid host on these occasions. The afternoons were spent in listening to instructive talks by various members of the organization. The president and founder of the company, T. L. Smith, presided and was always ready with apt remarks, both in introducing the speakers and in adding to their talks. In his address of welcome he referred to the life history of the Smith mixer, dating back to its beginning in Mr. Smith's cellar workshop and following through the various trials and tribulations up to the present time. He was followed by E. W. Brackenbury, the company's well-known designer; E. W. Meyer, the genial chief engineer; P. G. West, the assistant sales manager, and Ross Hunter of Atlanta, Ga., district manager, who spoke on "A little mixer with a big market," which referred to the Smith hand mixer—a machine that met with great favor in the trade.

On the evening of the first day P. G. West entertained the guests with a beefsteak dinner at the Milwaukee Athletic Club. Each guest had to put on a white apron and fancy cap and be satisfied with primitive styles. The

table and chairs were made from old boxes and barrels and the service was from pails, buckets and small boxes. The refreshments came direct from the keg. The dinner was followed by a theater party.

The second day's program included an address by the head of the crusher plant, George Hubbell, who, with T. L. Smith, gave a clear and concise exposition of the Symons Gyratory Crusher. This was followed by practical demonstration of the Fairbanks-Morse gasoline engine by Mr. Trimble, representing the Chicago office of the Fairbanks-Morse Company. The Wisconsin district manager, E. R. Marker, gave his views on "Sales Correspondence," which clearly showed how to obtain prospects and how to convert them into orders. W. J. Buckley and Charles F. Smith were also among the speakers.

In the evening the banquet in the Red Room of the Pfister Hotel was a fitting climax to the happy occasion. T. L. Smith again presided and called for many toasts. The speakers included A. L. Tucker, Chicago district manager; C. L. Kirk, who handles the Pittsburgh territory; E. R. Marker and Ross Hunter. Anecdotes, stories and good humor flowed freely when J. A. McCarty responded to "Soldier, Policeman, Salesman—or how I kissed the Blarney stone."

Porter's Storm Proof Barn Door Hanger

A new barn door hanger containing a number of interesting features which are rendering it very popular with builders, contractors and especially farmers, is the No. 10 "Storm Proof" hanger which has just been placed upon the market by J. E. Porter Company, Ottawa, Ill., and the general application of which is illustrated in Fig. 2. This barn door hanger, as will be noticed from an inspection of the picture, is made with two steel wheels placed tandem and having anti-friction roller bearings. The hanger wheels are supported by a truck frame made of steel. In the center of the truck is a malleable support which carries the steel strap which attaches to the door. Each of the two wheels has a rib in the side of

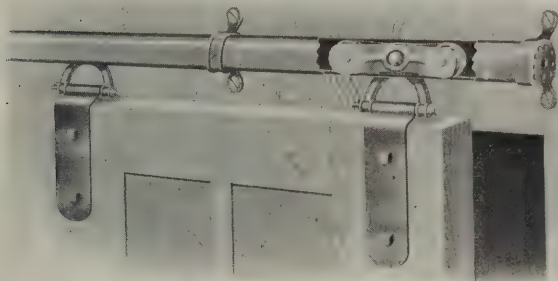


Fig. 2—Porter's Storm Proof Barn Door Hanger

the face, the rib riding in the slot of the track. The arrangement is such that the wheels cannot get out of line, and as the track surface is perfectly level the wheels run with a minimum of friction. The adjustable feature of the storm proof hanger enables the user to adjust the door to and from the building, while the up and down adjustment permits of the door being lowered or raised, as is sometimes necessary in cold weather when the ground freezes and thaws. By turning the nut on the under side the door is raised from the ground allowing it to clear and roll freely. The tornado track is said to combine all the strength of the round construction with the great advantage of a flat surface on which the steel wheels roll, thereby doing away with all tendency of the track to spread between the brackets. It will be noticed that the brackets for the track are attached below as well as above it, thus giving it much the advantage in the carrying strength of the track as compared with brackets attached in the ordinary way—only at the top. The unique shape of this new track does away with the necessity of its being tongued and grooved, as it is held firmly in position by the track bracket, rendering it impossible to turn it out of line.

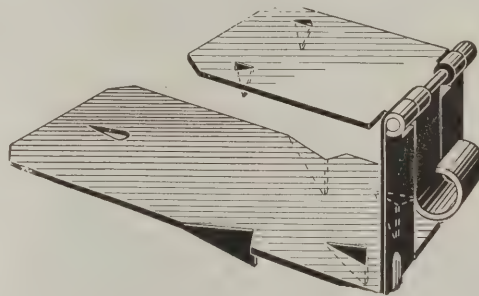
Concrete Marble

The Art Stone Company—Amos Stouffer, Supt.—Waynesboro, Pa., is sending out a folder relating to the various forms of decorative work in concrete which are possible by its processes and formulae. It suggests to the contractor that he meet the cut stone, marble, granite and pressed brick trade and their price lists and make money on pink and gray granites, concrete marble, molded and enameled brick, art marble for exterior and interior work,

terrazzo floors and better work generally in all lines of concrete. The folder gives some of the processes and formulae which are available and the company sends with the folder a leaflet showing in colors some of the effects possible in the way of decorative work through the use of these processes. The point is made that the many new and profitable lines of work which are explained and formulae given for their manufacture offer an opportunity to start a business with very little capital, shop room or expense. It is an all-the-year-round business and the statement is made that one does not need to be a concrete worker or to operate a concrete plant in order to engage in it. The labor is light and easy, no machinery is required and the molds necessary can be readily made at trifling cost.

New Scaffold Bracket for Roofs

A new candidate for popular favor in the shape of a bracket for scaffolds upon a roof is that illustrated



New Scaffold Bracket for Roofs—Fig. 3—General View of the Bracket

herewith and which has just been placed upon the market by the Richards-Wilcox Mfg. Company, Aurora, Ill. It is so designed that it can be placed on the roof in a few seconds and the claim is made that it will not split the shingles. It is stamped from heavy sheet steel, a general view of its appearance being presented in Fig. 3 of the engravings. The bottom plate has four $\frac{1}{2}$ in. sharp projecting lugs clearly shown in the illustration, which are forced into the roof when weight is applied to the bracket, thus preventing the latter from slipping out of place. The top plate is strongly hinged to the upright end of the bottom plate and has an extending arm against which rests the 2×4 piece which really constitutes the scaffold.

When the 2×4 strip is pushed against the extending arm the two sharp lugs projecting from the top plate are forced into the top of the strip and hold it tightly and securely in place. In Fig. 4 of the illustrations we show the Richards-Wilcox Scaffold Bracket in actual use. It will be seen that the bracket does not require any nails to hold it in place or any hammering, but the more weight put upon the bracket the tighter it grips the roof. These brackets are placed about 10 ft. apart and two brackets will carry four men on a roof. The point is made that



Fig. 4—Showing the Application of Scaffold Bracket on a Roof

the bracket can be used in repairing old roofs as well as for new work, also in connection with the painting of roofs or the repair of chimneys.

Catalogue of Woodworkers' Tools

An attractively printed catalogue of 48 pages illustrating and describing an extensive line of woodworkers' tools reaches us from the Joseph Woodwell Company, 201 to 203 Wood Street, Pittsburgh, Pa. Attention is called to the fact that the great variety of tools embraced in the company's stock cannot be included in the limited space of the catalogue, but if the reader should not find in it just what he wants it is suggested that he communicate with the company direct. Tools ordered by mail are as carefully selected

and furnished on as good terms as if selected in person, as a special endeavor is made to see that all mail orders are filled with clean, fresh goods. The lines covered by the catalogue constitute a very large assortment of tools adapted to the wants of woodworking mechanics. Among others mention may be made of adjustable planes, scrapers, boring machines, miter boxes, carving tools, cabinet makers' clamps, chisels, levels, ratchet braces, gauges, spoke shaves, dividers, drawing knives, pattern makers' knives, drills, bits of all kinds, hammers, hatchets, wood turning lathes, picture frame machines, rules, saws, nail sets, squares, tape lines, vises, home work benches, etc.

The Stern Floor Scraper

A floor scraper designed by a practical carpenter after much thought had been given to the requisites of a satisfactory machine of this nature, is the device brought out by the Stern Mfg. Company, Lancaster, Pa., and illustrated herewith. The scraper embodies a form of construction which enables it to be placed on the market at a price as the company puts it "within the reach of every contractor's bank account." The material used in the make-up of the Stern floor scraper is of the best quality from the hard-



Fig. 5—View of the Stern Floor Scraper with Weights Removed

wood handles down to the solid rubber tires which support it. It is finished in a rich velvet black trimmed in garnet. Every part is carefully tested before it is placed in the machine and it is assembled by expert workmen who have at their disposal the latest modern machinery. The company states that every scraper is thoroughly inspected before leaving the factory and should any part of the machine prove defective at any time the company will make it good. The handle and blade can be adjusted to a thousandth part of an inch, while the blades can be removed and replaced instantly by a turn of the hand. There are no bolts or nuts to contend with and no wrenches are necessary. The scraper here shown will hold any size blade up to $3\frac{1}{2} \times 7$ in. and no specially designed blade is required, every hardware store having a blade that will fit. With the scraper two weights of 20 lb. each may be used, these being removed and replaced quickly according to the class of floor the operator is finishing. In Fig. 5 of the engravings the Stern floor scraper is shown with the weights removed. The complete scraper weighs 125 lb. and with a little practice, it is claimed, a workman can finish a floor in one-third to one-fifth the time that it takes by hand and at the same time do as high grade work. The hand-holds on each end of the scraper render it easy for two men to move it from place to place. With the handle in an upright position one may scrape the floors of narrow rooms and halls that could not be worked in the usual way. In removing or replacing the blade it is merely necessary to turn the hand wheel on the blade holder. With each scraper the company furnishes six blades of assorted sizes unless otherwise ordered.

A leaflet which the company has issued gives full directions for setting the weights and sharpening them, together with hints as to the various adjustments. The point is made that care should be exercised to adjust the handles so that at no time will the wheels be off the floor as the weight of the scraper is sufficient for all kinds of work. It is also pointed out that by the use of this scraper waved or chattered floors are impossible.

Van Guilder System of Concrete Construction

A new illustrated instruction folder has just been issued from the press by the Van Guilder Hollow Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y. This folder is profusely illustrated, showing full equipment for economical and efficient construction and which cannot fail to be of interest to every general contractor engaged in the building business. The company points out that from the very first it has made a practice of publishing letters with photographs of buildings erected by its system, involving the continuous air

chamber from cellar to roof, giving names and addresses of owners, architects and builders. These letters express so much satisfaction and are such striking evidence of the success of the system that the company has taken this means of giving the public the practical results of others rather than its own theories. Reference is made to the Van Guilder system as one which has solved the problem of erecting damp-proof, frost-proof, vermin-proof, fireproof concrete steel reinforced buildings. Some of the illustrations relate to work which has been carried to completion by means of the company's machines.

There is also being distributed by the company a folder showing a contractor's full equipment and consisting of what the company designates as its "AA Outfit." The company points out that it makes use of box window frames and with the outfit the builder can set the frames in place and work up to them the same as when building a brick house—a feature which is referred to as more economical while making better construction work. The outfit consists of four styles of Van Guilder hollow wall machines, together with a variety of attachments for chimneys, corner pilasters, bay windows, doors, etc., etc. We understand that a copy of these folders will be sent to any architect, contractor or builder who may be interested.

Vulcanite Asphalt Shingles

A comparatively new departure in the way of a roof covering is the Vulcanite Asphalt Shingles which are being introduced to the attention of architects, contractors, builders and house owners generally by the Patent Vulcanite Roofing Company, 2498 Ogden avenue, Chicago, Ill. In a circular sent out by this concern the merits of these shingles are set forth in convincing style. The shingles are made from heavy vulcanite roofing and are cut 8 in. wide and $12\frac{3}{4}$ in. long, with a portion exposed in roofing 4 in. deep and 8 in. wide. They are produced in light and dark gray, terra cotta, brown and gray green shades. The claim is made that these shingles are pliable, making it an easy matter to lay them on any curve or roof angle; that they are waterproof, fire-resisting, and that they will neither warp nor crack. The company maintains several factories, these being located at Franklin, Ohio; Anderson, Ind.; Kansas City and San Francisco, and maintains offices and warehouses in New York City, Cincinnati, Dallas, Texas and Birmingham, Ala.

Oshkosh "Eveready" Saw Rig With Timber Borer

In order to overcome what has heretofore been great difficulty in connection with heavy framing—the boring of the timbers—the Oshkosh Mfg. Company, 514 South Main Street, Oshkosh, Wis., has fitted its "Eveready" portable saw rig with a boring device which enables the former to bore heavy beams and girders as they lie upon the ground.

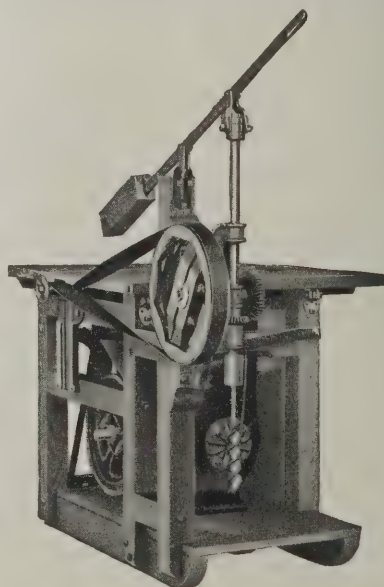


Fig. 6—The Oshkosh "Eveready" Saw Rig with Heavy Timber Borer

In Fig. 6 of the accompanying illustrations we show a general view of the saw rig equipped with the boring device and in operation it is a very simple matter to drag the piece to be bored under the auger and the boring is quickly accomplished. The device can be quickly attached and detached and it does not therefore interfere with the use of

the saw rig in its many other capacities. The company states that it has been thoroughly tested and is giving entire satisfaction wherever used.

Stanley's Ball Bearing Butts

A poorly hung door which creaks and binds is a source of continual annoyance and dissatisfaction. The cause is usually to be found in the hinges, which either are not of the proper size or are of inferior quality, poorly manufactured of cheap materials. The builder should use care in selecting the hinges for any piece of work, buying only standard makes of good quality and properly finished to match the other hardware. The ordinary type of door butt with loose pins has directly bearing joints. No matter how well made this type of butt will gradually wear down, causing the door to sag and bind. Consequently



Stanley's Ball Bearing Butts—Fig. 7
—The Ball Bearing Washers

various types of friction-reducing washers have been introduced by different manufacturers. Extensive laboratory tests, as well as the severest wear in actual service, have demonstrated that butts equipped with ball bearing washers, as shown in Fig. 7, will wear longer and with less friction than any other butt.

These butts have patented washers, usually two to a butt, each containing a number of hardened steel bearings protected by a brass cap from dust and moisture. Each of these steel balls will sustain a crushing load of 1000 pounds, and as the entire weight of the door turns on these bearings it can readily be seen that the butts will not wear down under the weight of the heaviest doors. The protection of the bearings by the brass cap makes oiling unnecessary, a considerable advantage, as the use of oil tends to mar the high finish of the hinge.

Stanley's ball-bearing butts, shown in Fig. 8, have another feature in the patented non-rising pins, Fig. 9, which will not work out of the joint under the action of the door and yet can be readily removed when necessary. Ball-bearing butts are made in wrought steel and bronze and can be procured in all sizes from 2½ to 8 inches in any desired finish.

The Stanley Works is also manufacturing a complete line of metal door butts, both with and without ball-bearings. These butts have the holes accurately drilled to template to match the holes in the door frames and metal doors. Templates for the use of the builder are furnished on orders when desired.

The Stanley ornamental surface butts are now widely used for cheaper work in all parts of the country. Their chief advantage lies in the reduction of the time and labor required to hang the door. These butts are made with slotted ball tips which permit the pin to be reversed, so that the butt can be used on either right or left-hand doors.

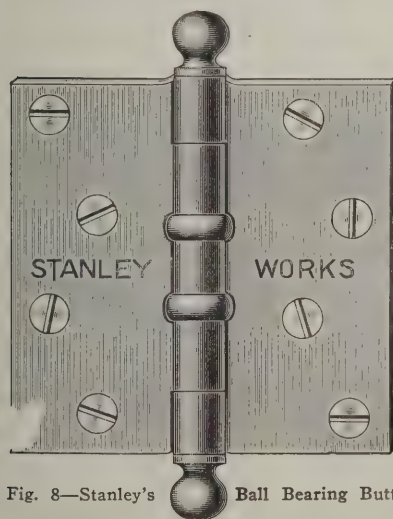


Fig. 8—Stanley's Ball Bearing Butt



Fig. 9—Non-Rising Pin

butts for various purposes and a line of ornamental surface butts usually procure by consulting local hardware dealers.

Samples of Hardwood by Parcel Post

The first concern in the State of Indiana to take advantage of the parcel post delivery, which went into effect at

midnight on the morning of January 1, was the Interior Hardwood Company, Indianapolis, Ind., which sent out a thousand samples covering every section of the country from Maine to California. The blocks of hardwood weighed from 6 oz. to 16 oz., and the postage from 6 cents a package to 16 cents, according to the zone of delivery.

The packages were brought to the post office the night before and the shipment was accepted on the stroke of midnight, the hour when the parcel post law went into effect. Clerks were assigned to distributing the parcels to the various trains leaving Indianapolis early in the day, and the first shipments left the Union Station shortly before 2.30 o'clock, at which hour mail trains for the East and West take their departure.

Champion Mortiser

A large class of our readers will be interested in the Champion mortiser which has been placed on the market by the J. Leukart Company, 32 to 40 East Columbus Street, Columbus, Ohio, and which is illustrated in general view in Fig. 10. It is especially adapted for door locks, sash pulleys, screen frames, folding door rollers, cabinet work, etc. It is automatic in its action and will cut a perfect mortise without the use of a brace and bit or any other tool.

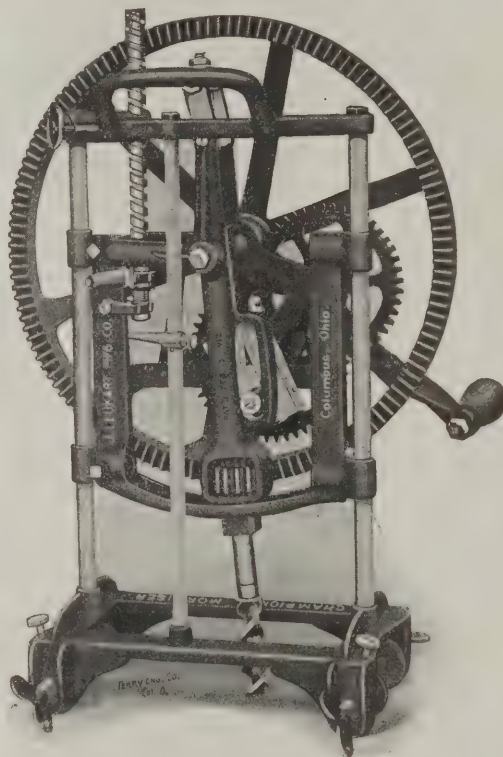


Fig. 10—The Champion Mortiser Made by J. Leukart Co.

The ball bearings in the end of the spindle relieve all friction and the automatic feed is operated with a cam. The automatic stop is adjustable to cut any depth desired and the bit feeds 1/16 inch at each complete operation. The claim is made that a machine will cut 120 mortises in eight hours and will quickly pay for itself. The base and standards are made strong, the operating parts are machined and the arrangement is such that all wearing parts can be taken up. The company guarantees the Champion mortiser for a period of one year and will replace at any time within that period any broken or defective parts that are not caused by misuse, accident or neglect. The machine is built to cut from a round hole to a perfect mortise 6 in. long and 4½ in. deep, straight sides and bottom and through hard, soft or knotty wood, dowel pins or panel ends, with or against the grain.

Something About "Certain-teed" Roofing

It is generally conceded that the prime factors of any building material are its suitability and durability. That wonderful strides in building construction have been made is everywhere recognized, yet the roof covering is a phase of the subject which constantly invites discussion. The architect, the roofer and the property owner are interested in covering the roof of the structure with a material which will keep out the elements and at the same time be such as to endure for a long period without undue cause for repairs. The owner is the man who pays the bill, the "ultimate consumer," whom the economist is striving to as-

sist and protect, and it is the duty of the architect and the contractor to assist him to the fullest extent possible, which the former can do by first specifying a roof of known worth backed by the guarantee of the manufacturer and applied by a reputable contractor—one in which the manufacturer has sufficient confidence to join with him in the guarantee. One method of accomplishing satisfactory results as pointed out by the General Roofing Mfg. Company, East St. Louis, Ill., is to have the architect specify "Certain-teed" products. If the plant is a manufacturing establishment with flat roofs pierced with saw tooth skylights, he will give a "Certain-teed" Specification Roof—a built-up-on-the-roof asphalt covering constructed of layers of "Certain-teed" roofing cemented with cold liquid "Certain-teed" cement. This it is claimed does not require coating or painting and the maker joins with the roofing contractor in a 15 years' guarantee. While this may seem a long period it is interesting to know that the manufacturer of the material entering into the roof has had a quarter of a century of actual experience in mining, milling and blending the mineral asphalt and mineral asphalt oils which he uses to saturate his felts and in his coatings and cement. Asphalt, it may be noted, dries out slowly and "Certain-teed" asphalt products are claimed to stand in any climate from the equator to the frozen far North and in every quarter of the globe. In "Certain-teed" products is no saline matter that water will attack; no sulphur to harden and disintegrate; no adulteration by tar and tar products, as its bitumen is 99% plus, pure, and the highest grade waterproofing material. The manufacture of "Certain-teed" felts and their construction with roofing materials and the blend of the asphalt and the oils is carried on in the plants of the company located at East St. Louis and Marseilles, Ill., and York, Pa. It is stated that reputable roofers only can apply "Certain-teed" Specification roofs. With them the "General" joins in the guarantee; with him the question of faulty workmanship cannot arise, for it is properly done with the right material. He has just issued a book entitled "A Mass of Evidence" backing up his proposition and will be pleased to send a copy free of charge to any architect who may make application. The book is not a mass of testimonials, but shows illustrations of actual buildings of every kind and use that are covered with "Certain-teed" materials and demonstrate unusual construction.

Price's Brad Driver

A tool intended for placing and driving small brads ranging from $\frac{1}{4}$ in. to 1 in. in size and which will be found of special interest to cabinet makers, pattern makers, picture frame workers, and others having occasion to use quantities of small nails of the nature indicated, is the Brad Driver, which we illustrate in Fig. 11, and which has just been patented and placed on the market by the Tom Price Mfg. Company, Cooper, Texas. The tool is 9 in. long over all, has a rock maple handle, mahogany stained and French polished. The working parts are brass with the exception of the nozzle and the plunger, while all exposed metal is nickel plated except the nozzle, which is of steel, polished and blued. All parts are interchangeable.



Fig. 11—Price's Brad Driver

The tool can be held and operated with one hand, while the other is free to hold the work in place. After the brad is in place the head can be countersunk by giving the end of the handle of the tool a slight blow with the palm of the hand. The claim is made that with this tool there is no danger of marring the face of the most delicate work. There is nothing about the tool to wear out except

the plunger and this costs only 6 cents to replace. The company points out that it will send the tool direct on receipt of price and if not found satisfactory after a practical test it can be returned and money will be refunded.

Parks' Portable Combination Woodworking Outfit

A special feature of the combination machine which is being turned out by the Parks Ball-Bearing Machine Company, Station A, Cincinnati, Ohio, is its portable nature, and the fact that it can be readily mounted upon a truck as shown in Fig. 12 of the engravings, thus permitting of its easy transportation from one job to

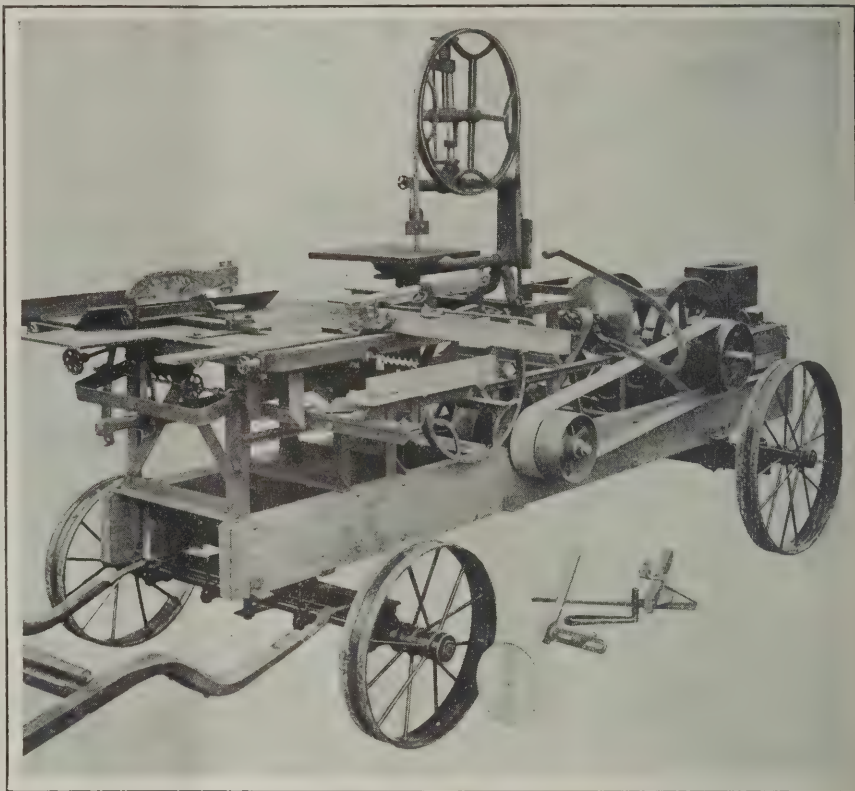


Fig. 12—Parks' Portable Combination Woodworking Outfit

another. The combination consists of a circular saw, a 6-in. joiner, with spring to hold down the material, a tilting guide, a 22-in. band saw, a swing cut-off saw, a reversible spindle shaper, boring attachment, a 3-in. joiner with head, and a side cutter. There is also tenoning and angle adjustable cross-cut guide with adjustable stop. The machine is of a nature to be of special interest and value to the contractor and woodworker generally. It may be operated with electric motor or gasoline engine, as may be most convenient.

Lane's Joist and Timber Hangers

Lane Brothers Company, Livingston street, Poughkeepsie, N. Y., are offering to send free to architects and builders who may be interested handsome aluminum models of its well-known steel beam hangers which are offered in such variety as to meet varying requirements. These hangers are made from soft steel bars of quality especially adapted to the use. The material being uniform in cross section the hanger is of equal tensile strength throughout. Square supporting arms and ample nailing surfaces are provided. One style of hanger is especially adapted for setting in brick walls. The arms are usually extended into the wall the width of one brick for light hangers or the width of two bricks for large ones, the arms being square the strains are direct. Sometimes hangers shorter than the depth of joist are used, as for example a 2 x 8-in. hanger is used for 2 x 12-in. joist. Another form of hanger is made to hook over wooden beams, steel I-beams and concrete blocks. For wood they have spike holes in the hooks as well as in the arms. The claim is made that spiking the hooks adds greatly to the stability. When used on I-beams the hooks are clinched under the flange after the hangers are in place. In "double" hangers the supporting arms, which extend square across the beams are riveted directly together if the width of the beam is 8 in. or less. When the sup-

(Continued on page 38)



Concrete Barn Built With Blaw Steel Forms

Stop Cutting Up Lumber FOR Forms

Use Blaw Steel Forms on Your Foundations, Walls, Floors, Columns. They will save you 30 per cent in Labor Cost. They Produce a Better, Cleaner, More Accurate Job and you have a Permanent Equipment. Write today for details.

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"American Seal" is the paint of Real Economy. It doesn't cost less by the can, but it **does** cost less by the year. It's a lasting paint, doesn't crack, crumble, chip or peel—doesn't expand and contract unequally, but remains a perfect protection to the surface.

"American Seal" can be easily proved cheapest in the long run. Its use results in permanent jobs. "American Seal" comes ready to apply. Simply follow directions and you will be well pleased with the results.

Write for color chart and full particulars. Do it now—a postal will answer.

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TOOLS OF QUALITY

For 65 years—since 1848—we have been handling tools. We have studied them, worked with them and from our own experience we know that only good tools—tools with a reputation behind them—are the kind to use. They will stand the strain, last longer and give better satisfaction. For this reason we carry the cream of the market—Disston Saws, Russell Jennings Bits, Buck Bros' Chisels, Hammond Hammers, Stanley Planes and scores of other brands equally as well known. You can get all of them from us and at moderate prices.



We have a special 200-page Catalog of Tools, No. 3097, which we will send to Tool Users.

HAMMACHER, SCHLEMMER & CO.

HARDWARE, TOOLS & SUPPLIES

4th Ave. & 13th St.

NEW YORK, SINCE 1848.

porting beam is wider than 8 in. the hanger arms are riveted on top of a bar of equal size material. In either case there is a double thickness of stock over the edges of the supporting beam, thus obviating the tendency to crush wooden beams under a heavy load at this point. The company has issued a circular relating to its patent joist and timber hangers and in connection with it a table is given showing the comparative strengths of different sizes, also dimensions, code words, etc.

The company states that the demand for its joist hangers has been so great as to necessitate an increase in manufacturing facilities, and to this end it has just completed the erection of new buildings wherein the company doubles its former outlook. The statement is made that 20,000 hangers in 100 sizes are always in stock for immediate shipment.

The "Big-An-Little" Concrete Mixer

In order to supply the demand of building contractors for a batch concrete mixer of suitable capacity to render it of economical use in their regular construction work, the Jaeger Machine Company, Columbus, Ohio, has placed on the market what is known as the "Big-an-Little" concrete mixer shown in Fig. 13 of the illustrations. This machine is said to give a "a mix-a-minute" and has a rated capacity up to 50 cu. yd. per day. The mixing drum is loaded from one end and the mixture discharged from the other, control being provided by the dumping lever shown. While the machine is in operation the drum is constantly revolving, and this motion, together with the design of the mixing plow, are claimed to give a thorough mixture. The machine is operated by a $2\frac{1}{2}$ horse power gasoline engine, and embodies all the best features resulting from the company's nine years' experience in designing

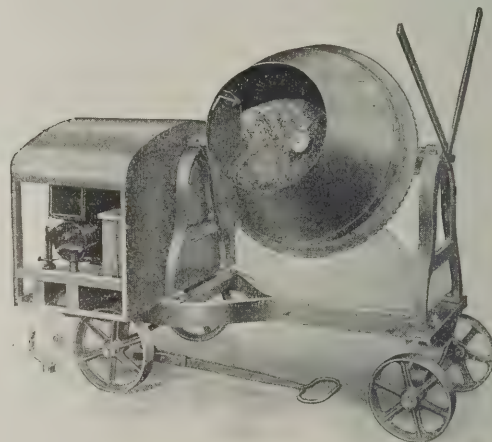


Fig. 13—The "Big-an-Little" Concrete Mixer

and making concrete-mixing machinery. It is both simple and economical in operation and is claimed to effect a saving of 50 cents per cu. yd. over the cost of hand mixing. It is of a capacity well suited for the average building contractor, who does not wish to incur the expense of a large machine. A special circular giving full particulars of the "Big-an-Little" mixer has been issued by the company and a copy of it may be secured by any reader on application to the address given.

Art Kraft in Metal

Under the above title the Canton Metal Ceiling Company, 1946 Harrison Avenue, Canton, Ohio, has just issued a most interesting and attractive catalogue of metal ceilings and side wall designs. The work is profusely illustrated, the engravings are well executed and the printing shows the details of the designs with great fidelity. The designs illustrated, however, are only a few suggestions of the many combinations and treatments possible with the company's various field plates, borders, fillers, cornices, etc. The designs presented are referred to as being absolutely new and as "unquestionably the crowning success of the foremost ceiling designer and sculptor in the country." The dies used are new, insuring a depth and distinctness of the ornamentation impossible with old and worn dies. The heavy drop hammers used give a clearness of outline and delineation which it is claimed are not obtainable with smaller hammers or hydraulic presses. The company occupies new fireproof buildings equipped with the most modern and improved machinery and with the excellent shipping facilities which it enjoys it is able to give a more prompt service than ever before.

The designs illustrated in the catalogue under review can for the most part be applied direct to sheathing with-

(Continued on page 40)

GOODELL

You Will Buy This All-Steel Mitre Box

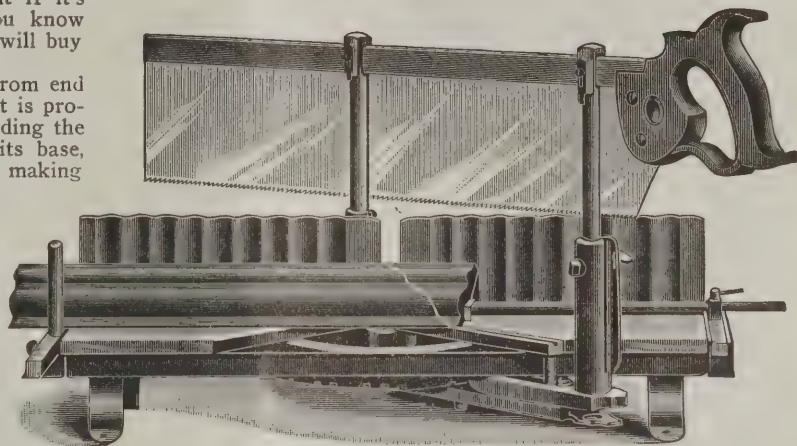
In fact you can't help buying it if it's shown to you, and the more you know about mitre boxes the quicker you will buy it.

The Goodell is made of Steel—from end to end and all the way through. It is provided with automatic stops for holding the saw, it has an accurate scale in its base, and is fitted with a gauge for making duplicate cuts, etc.

It cannot break and get out of order—it is always ready to do fast, accurate work at no notice.

Send for Circular K and prices—now, in time to have it for your spring building work.

Goodell Mfg. Co.
Greenfield, Mass.



A New Sensation TORNADO "STORM PROOF"

The Barn Door Track with the
DOUBLE SUPPORT

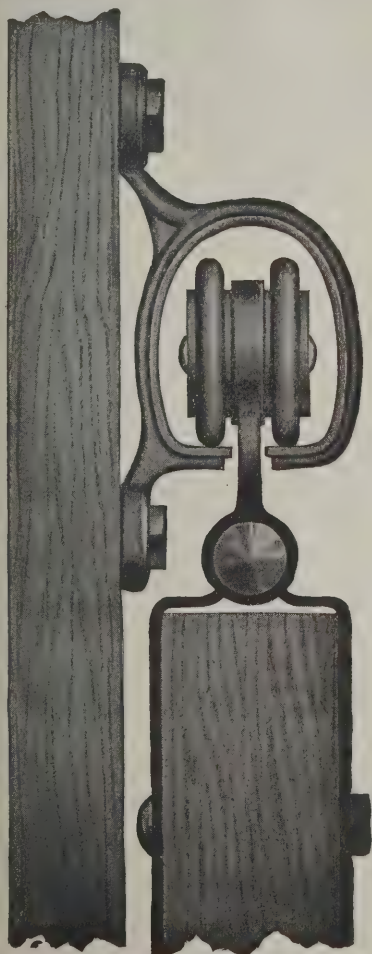
Track bracket attaches to building **BELOW** as well as above, which is a great advantage, as it adds materially to the carrying strength of the track.

A tubular track made with a perfectly level surface for the steel wheels of the hangers to roll on.

The Tornado is also furnished with an adjustable strap so that door can be raised or lowered and set in or out from the building.

Send for catalogue showing complete line of Door Hangers and Barn Equipment.

J. E. PORTER COMPANY
OTTAWA, ILLINOIS



SIMONDS HAND SAWS

As near a perfect
saw as has yet
been made for
Carpenters



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Copy of Catalogue will be sent free to any interested file
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out strips, but complete working drawings are furnished with all ceiling orders shipped where sketches have been submitted to the company so that the material can be erected without difficulty. In the catalogue are rules for measurement with a diagram showing just how to do the work and the general information contained is of a nature to appeal to the architect, the builder, the contractor and the sheet metal worker, to say nothing of the owner of the building. The designs are of a varied and striking character and adapted to meet current requirements. An index at the close greatly facilitates reference. The work is known as Catalogue "C" 1913 issue, and a copy of it will, we understand, be sent to any architect, builder or sheet metal worker who may be interested.

Cutter Head for Jointing and Sticking Moldings

One of the latest additions to its already extensive line of specialties of interest to the woodworker just brought out by Huther Brothers Saw Mfg. Company, 2500 University Avenue, Rochester, N. Y., is the cutter head for jointing and sticking moldings on a saw table illustrated in general view in Fig. 14 of the engravings. The knives are adjusted by the use of headless set screws and are securely fastened by a hexagon head bolt. The regular size head is made so that the cutting edge of the knife is 1 3/4 in. wide. This jointer and sticker head can be used on any ordinary saw mandrel. The company also makes knives to fit regular size head to be used for matching, panel raising and sticking regular or special moldings.

Another new device is an Improved Sectional Chip Breaker for use on molders, planers and matchers, this being made up in sections 1 in. wide with a spring under

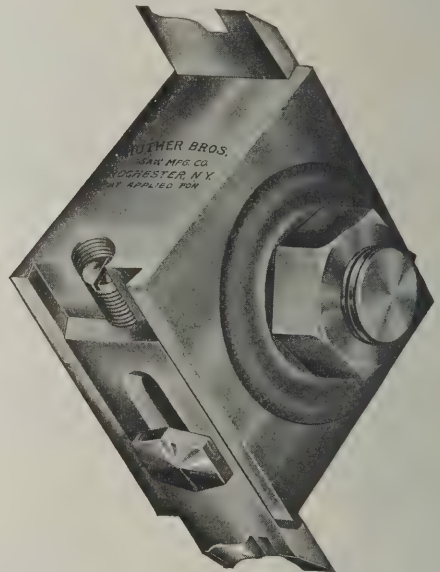


Fig. 14—Cutter Head for Jointing and Sticking Moldings

each section. By this arrangement the sticker operator is enabled to produce smooth moldings either wide or narrow without the least trouble.

In the company's general Catalogue No. 33, consisting of 92 pages of profusely illustrated matter, the merits of the leading lines turned out are set forth. The company makes a full line of shingle, edger and heading saws, particular attention being given to their grinding and straightening. It also manufactures a complete line of circular knives for cutting cloth, cork, etc., circular milling saws, cutters, saw mandrels and planer knives, together with special saws, including those for cutting beading, molding or special shaped grooves. Another of its products are lock corner cutters with teeth relieved so as to do away with all friction when in operation. A special hollow ground saw for smooth cutting either with or across the grain is included in the goods to which reference is made. This same style of saw with combination teeth is used extensively by pattern shops and packing rooms. The band saws of the company are made from a high grade of imported band saw stock. The saws are either cut to length and brazed or furnished in coils as may be required. The catalogue is arranged in attractive style and we understand that a copy of it will be sent to any reader who may make application for it.

Blaw Steel Wall Forms

The increasing use of concrete in building construction renders specially interesting to the contractor a Bulletin issued by the Blaw Steel Construction Company, Westinghouse Building, Pittsburgh, Pa., relating to the steel wall

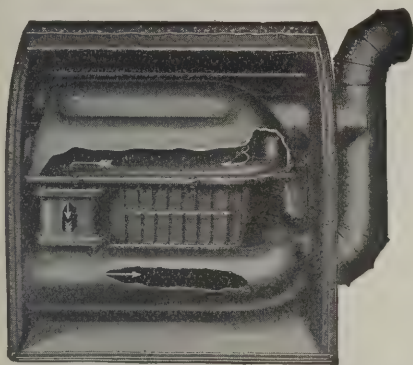
(Continued on page 42)

BRIEN HEATERS

MAKE FRIENDS IN THE HOME

Because they furnish a *full volume of heat, to every room, making the whole house warm and cheery no matter what the weather outside.*

The low construction of the Brien allows for a sharp pitch to all cellar pipes even in the shallowest cellar.



The Hottest Thing On Earth

This results in every pipe carrying its full capacity of warm air at all times.

The Brien is also the most economical with fuel because it has more radiating surface, and a longer fire travel than any other.

It is the only heater which has a complete double casing, with $\frac{3}{4}$ inch air space between; insuring a cool cellar for storing vegetables, etc.

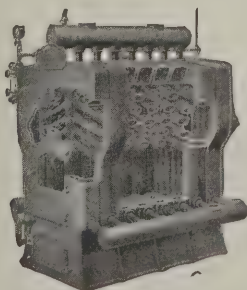
Let us estimate without obligation to you a scientifically correct heating plant for your home. Send to-day for our catalogue and give us the measurements of your house.

BRIEN HEATER CO., WESTFIELD, MASS.



Craig Boilers
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Norka Radiators

The
WILLIAMSPORT LINE



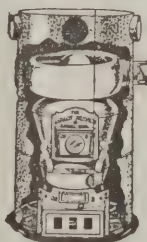
Every builder should investigate this High Class Line of Boilers and Radiators

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Write for Catalogue 812

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**Write At Once for the Jahant Specification Hand Book—
It's Free**

This book tells you what you ought to know about proper heating and ventilation, and tells why you ought to specify the Jahant Down-Draft Furnace.

It tells how to estimate on the cost of proper heating equipment; how to reduce your bids and at the same time turn out a better job with a better profit for yourself.

It explains the construction and operation of the Jahant and how it delivers plenty of heat wherever and whenever heat is needed at a saving of one-third to one-half in fuel bills.

It tells how we back your recommendation of the Jahant Furnace with a legal binding 360 Day Guaranty Bond—and it contains a lot of other information which you cannot afford to be without. Write for the book to-day.

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**Start to
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NOW**

Forget the past and start up out of the old ruts NOW! Put your best foot forward by ambitiously learning one of these big-paying trades; thoroughly taught at your own home in your spare time if you wish! Mail the coupon now! You study plans of buildings actually being constructed. Work approved by leading Chicago experts. Complete outfit free. Free employment bureau. Low tuition. Home study work same as in college day and evening classes. We give both resident and correspondence courses. State which on coupon. Make your start NOW!

CHICAGO TECHNICAL COLLEGE
679 Athenaeum Bldg., Chicago, Ill.

CHICAGO TECHNICAL COLLEGE, 679 Athenaeum Bldg., Chicago, Ill.
Gentlemen: I have marked with a cross (X) the branch or branches interesting me. Please tell me how I can qualify for a good, well-paying position.

- | | |
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| ☐ Architectural Draft'g | ☐ General Contracting |
| ☐ Builders' Course | ☐ Structural Drafting |
| ☐ Estimating | ☐ Structural Design |
| ☐ Plan Reading | ☐ Mechanical Drawing |
| ☐ House Planning | ☐ Machine Drafting |
| ☐ Bldg. Superintendence | ☐ Machine Design |

Name _____ Address _____

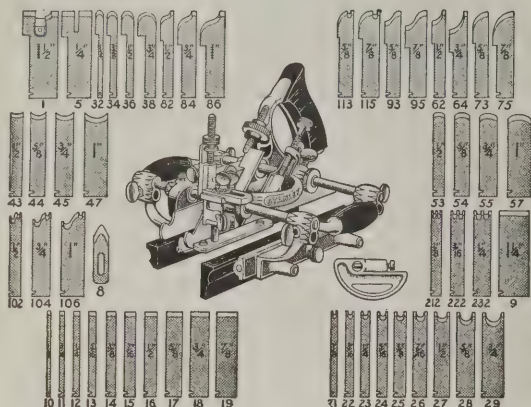
Town _____ State _____

Resident or Home Study Course _____



By
Mailing
this
Coupon

Stanley Tools



"55"

A Planing Mill Within Itself

THE "55" Plane will do a greater variety of work than can be done with a full line of so-called fancy planes. It is 10 inches long, weighs only 7¾ lbs. (with 93 cutters 11 lbs.), and replaces practically the complete line of fancy planes weighing, probably, 90 lbs.

¶ The regular Equipment sent with this Plane comprises the 52 cutters shown in the cut. A further line of 41 Special Cutters is regularly made.

List Price, \$14.00

¶ If unable to obtain this plane from your hardware dealer, we will, upon receipt of above price, send same, delivery prepaid, to any part of the United States.

ADDRESS

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

forms which it manufactures. These forms are especially adapted for concrete columns, beams, girders, foundations, sidewalks, buildings of all kinds, silos and, in fact, practically everything of which concrete is the prime building material. The steel forms are illustrated and described in a way to interest every builder who handles contracts involving the use of concrete, numerous line drawings showing how the forms are used in executing various kinds of work. The forms are practically indestructible and have a decided advantage over wood forms on any work where the forms may be used over and over again. The point is made that a steel form that has been used 100 times should be in better condition than a wooden form that has been used but twice, consequently the material cost of steel forms per unit of concrete surface is less than that of wooden forms.

Neponset Wall Board

Announcement is made by F. W. Bird & Son, 13 River Street, East Walpole, Mass., that Neponset Wall Board is now being offered in cream white and burnt leather finishes as well as in the original plain oak. With these three finishes many attractive combinations can be made with Neponset Wall Board. The usual arrangement is to use plain oak for wainscoting and finish upper walls with either the burnt leather or cream white finish and to use cream white on the ceiling. Battens in cream white and in plain oak finish are made of the same material as the wall board. These battens, of course, are much less expensive than wooden battens and being of the same finish harmonize better with the wall board. The white battens are especially useful on ceilings. In order to prevent buckling the surfaces of Neponset Wall Board have been thoroughly waterproofed. It is being used in all kinds of new houses, in camps, garages, barns, etc., and has also been used in remodeling old houses, in unfinished rooms or over the old plaster. For partitions as well as for walls and ceilings, in offices, factories and railroad stations, and for backing store windows it has proved very successful.

Metal Insurance

L. M. Stocking, of the Joseph Dixon Crucible Company, Jersey City, N. J., comments interestingly upon the subject of metal insurance which he states live owners of property are adopting throughout the country. Among other things he says: "If the rate for fire or life insurance is too low, you think twice before giving your risk to that company, as you doubt its ability to carry out its contracts under all conditions. If the rate is too high, you shun that company as an enemy of economy. A fair price for the best protection in a concern of reputation is your motto, and ours, in writing you this homily. What are we driving at? Why, metal insurance by protective paint! Do not paint your structures spasmodically. Metal surfaces should be inspected regularly and a paint applied which will give the longest service. Do not be deceived by the temporary allurements of a lower cost for paint of cheaper quality and resultant shorter service. A structure well painted is insured against decay and depreciation. Thus your property inventories higher and your profit and loss account stands you in more on the credit side. Never paint spasmodically; do not let your structure run down and then make a fruitless effort to bring it up to efficiency. This is waste of money and hits you hardest at your weakest time. Make regular inspection and paint with Dixon's silica-graphite paint. It is made in four colors and is equally suitable for metal or wood. Leading railroads and manufacturing have adopted it, after exhaustive tests, as their maintenance paint. It is nature's mixture of silica and graphite mined by the Joseph Dixon Crucible Company at Ticonderoga, N. Y."

Steel Forms for Concrete Work

To even the most casual observer and to the progressive builder in particular the fact cannot have escaped notice that reinforced concrete is rapidly growing in favor in connection with the erection of buildings of all kinds. Little by little it has supplanted the former methods for factories, warehouses, bridges, etc., while for residences and the lighter forms of buildings it is now coming more and more into use. In the case of buildings constructed of "poured" concrete one of the drawbacks has been the great waste in lumber and labor in the construction of wood forms which in most cases are built for a particular purpose and when that purpose has been served they are taken down with considerable damage to the lumber. Milton Dana Morrill, the well-known architect of Washington, D. C., and now of the firm of Read & Morrill, 179 Joralemon Street, Brooklyn, N. Y., encountered this difficulty in building poured houses and developed and perfected a system of standard sectional steel forms which has cut the cost of concrete work very appreciably, the claim being made that in some instances even

The Improved Perfection Mortiser

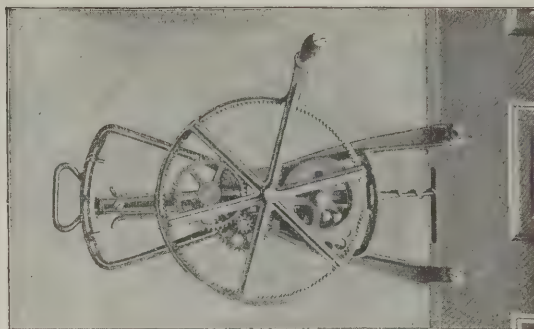
Any size, 6¼ inches to a round hole

Bit moves up and down while boring



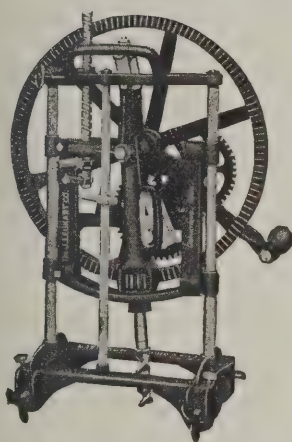
positively makes complete a mortise for locks, doing the work from start to finish. No other tools required.

The only tool of its kind.



Cuts mortise perfectly true and clean. Straight in at top and bottom, with straight back wall.

Perfection Mortise Machine Co., Columbus, Ohio



Champion Mortiser

Only machine that will mortise hard, soft or knotty wood, through dowel pins or panel ends with or against the grain of the wood with perfect ease.

Cuts a complete mortise with perfectly straight sides and bottom without the use of brace and bit or any other tool.

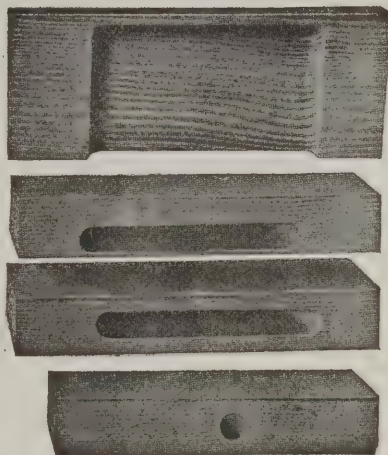
Adjustable from perfect round hole to 6-in. slot. Absolutely accurate in its work. Easy to operate. Built to last a lifetime.

Sent on Trial. Write for Descriptive Circular.

THE J. LEUKART CO.

32-40 East Columbus St.

Columbus, Ohio



OAK FLOORING

"America's Best Flooring"

Builders and Owners will find it a clinching argument to say "It's floored with OAK FLOORING." It is the biggest single feature to look for in any house or apartment building. It imparts an air of refinement and elegance. It is the modern flooring. OAK FLOORING ¾" thickness by 1½" or 2" faces can be laid over old floors in old homes or over cheap sub-floors at a very low cost. It is cheaper than carpets or pine flooring. When laid it has all the appearance of heavy flooring.

There is a solid satisfaction and lasting pleasure in the substantial and dignified appearance of OAK FLOORING.

Contractors and carpenters find it very profitable to lay ¾" stock over old floors in old homes during dull periods. A little canvassing is all that is necessary to secure jobs. A carpenter or handy man can lay OAK FLOORING successfully.

For durability OAK is the best. OAK FLOORING laid thirty years ago, after very hard use, is still in good condition.

Write for booklet.

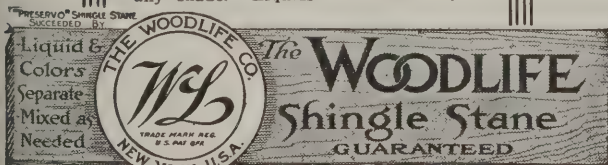
THE OAK FLOORING BUREAU, 895 Hammond Bldg., Detroit, Mich.



"Woodlife"

Is least expensive and most durable.

A "Natural" shingle stain, guaranteed for five years. It is durable, economical and artistic. May be had in any shade. Liquids and colors separate.



ately packed. To be mixed as needed. Widely used by architects and builders for shingled houses, bungalows and all rough wood. Write for particulars.

WOODLIFE CO.

188-190 Montague St., Brooklyn, N. Y.

Antiques ^{of} all Sorts

Send 4 cents for Catalog and Lists of Antiques—Rugs—Gifts. I ransack 1,000 attics annually. My stock is replete with fine Old Things from New England Homes.

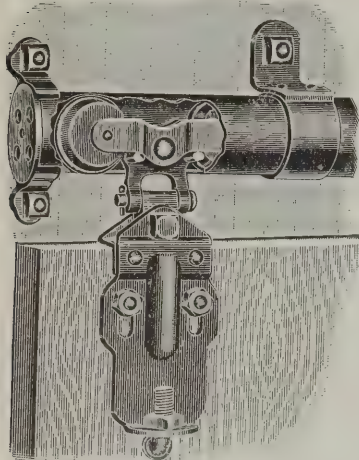
HAND MADE RUGS
Braided, Woven, Drawn-hooked Rag
Carpet Old Chintz, Patch Work.

RALPH WARREN BURNHAM
IPSWICH IN MASSACHUSETTS

When Your Job is to be inspected

Much depends on first impressions. If the door sticks or runs hard as it is opened, the first impression is bad.

Take no chances, make the first impression always good.



Doors glide open quietly, steadily and easily if mounted on

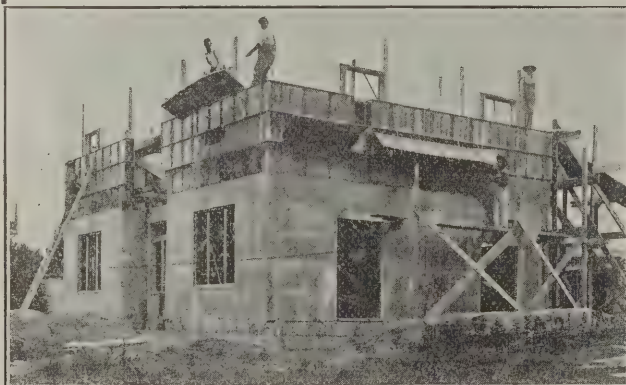
No. 440 Cannon Ball Door Hangers

They make doors trouble-proof. Take care of swelling and shrinking. With a wrench they are instantly raised or lowered—set nearer or farther from the building.

We make perfect door hangers for every purpose. They always make good. Once you know their merit, you'll use them always. Write for catalog today.

Hunt, Helm, Ferris & Co.
6602 Hunt St. Harvard, Ill.

The "Morrill" Steel Forms For Concrete Building



Pouring a house; famous two-tier swing-up process.

Reinforced concrete is fast becoming the universal building material. The only drawback has been the lumber and labor wasted in forms. The "Morrill" steel forms cut out this waste; can be used over 100 times on buildings of different dimensions and designs. A permanent investment, cutting out your material bills, giving better concrete, better finish and more speed at a remarkably low cost. As a progressive builder you need "Morrill" steel forms. These are of heavy pressed steel, wedge connections throughout, automatically coming to line; no scaffolding needed.

A card today will bring catalogues, illustrating steel forms, poured bungalows, houses and the one day process for house pouring. It will interest you.

READ & MORRILL, Inc.
179 Joralemon St. Brooklyn, N. Y.

to a less figure than for similar buildings in frame. It is said that on a group of 40 fireproof houses lately constructed at Nanticoke, Pa., for the employees of the Delaware, Lackawanna and Western Railroad the finished cost for each seven room dwelling was less than \$1,400. Several hundred of these poured houses have been constructed in various parts of the country and it is stated that they have proven warm in winter, thoroughly damp-proof and permanent. The system has been adopted in England, France, Austria, India and some 50 American and Canadian companies are said to be building or about to build by this system during the ensuing season. Thomas A. Edison predicted some years ago that concrete poured in metal forms would supplant present method of construction and the development of this steel form equipment has gone far toward the realization of the prophecy.

TRADE NOTES

The Charles H. Brown Paint Company, 188 and 190 Montague Street, Brooklyn, N. Y., is distributing among the trade a folder carrying a series of panels showing the many shades of pure linseed oil house paint which it is prepared to supply. It is stated that none but the best of pigments are used and that these are scientifically ground and reground with heavy machinery until they are thoroughly incorporated with the greatest amount of pure linseed oil, thereby insuring a maximum amount of durability. The claim is made that these paints effectively withstand the action of illuminating, coal and sulphurous gases, salt air and dampness. An analysis and five-year guarantee is on every package. The circular also carries directions for using the paint both in connection with new work and with old.

American Sheet & Tin Plate Company, Frick Building, Pittsburgh, has been distributing among the trade an attractive "weight card of formed roofing and siding products" which it manufactures. The information is given in the shape of comprehensive tables clearly printed in full-face type and illustrated by means of diagrams showing measurements for roofing and siding.

The February issue of the new house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill., known as "DooR-Ways," contains among other things brief reference to the business outlook; a likeness of Milton D. Jones, the secretary and treasurer of the company, together with a brief sketch of his business career; illustrations of some of the company's leading specialties, and a short chapter of special interest to architects and builders dealing with accordion folding doors. A statement signed by the president and general manager of the company states that 1912 was the best year in point of sales in its history, while December business was larger than that of any previous month. The company enters 1913 with a larger volume of business in unfilled orders on its books than in any previous year, all of which is pointed out as the strongest kind of evidence that the company's products and its service meet the approval of its patrons.

E. B. Badger & Sons Company, 65 Pitts Street, Boston, Mass., has issued a catalogue illustrating and describing a patent metallic fireproof window frame and sash. The sash is made in various styles and the construction is illustrated in such detail as to prove of special interest to architects and builders. A copy of the catalogue can be obtained on application to the company.

A. T. Stearns Lumber Company, Neponset, Boston, Mass., has recently issued an interesting pamphlet entitled "Cypress Lumber" which gives an extended description of the growth, cutting, marketing and use of cypress in building construction. It is of special interest to architects and builders by reason of the popularity which the wood has established for use in interior finish.

The Richard-Wilcox Canadian Company Ltd., London, Ont., has been granted incorporation papers with an authorized capital of \$70,000, to engage in the manufacture of builders' hardware, and a plant for the purpose will be erected. William R. Yendall, William A. Fitch and Lee E. Mighell are the provisional directors.

The Stewart-Mowry Company, Chicago, Ill., purveyors of special architectural varnishes for high-grade residences, was established in 1899 and about two years ago J. A. Stewart bought out the interest of Mr. Mowry, and he is now the sole proprietor. The company also manufactures varnish for high-grade carriages, automobiles and railway cars, for which there is a constantly growing demand.

Otis A. Smith, Rockfall, Conn., is directing the attention of carpenters and builders to his "New Complete

(Continued on page 46)

Get This:

Big New Builders' Catalog—Free

5,000 Bargains

Order All Millwork Staples and Specialties Direct from Gordon-Van Tine Co. Save Big Money

Here is a wonderful new Building Material Catalog that fairly bristles with bargains for carpenters and contractors. In it are over 5,000 money-saving offers on staple items in Millwork and specially designed material. No other book ever issued so perfectly meets every requirement of the Builder.

Gives complete data on all high-grade material,

with prices way under the present market. Saves contractors dollars on the smallest job.

And we guarantee quality to be of the highest.

We guarantee prompt shipment, safe delivery and absolute satisfaction.

We refund every dollar and pay freight both ways if buyer is not satisfied.

Prices on Staple Items Now Cut to the Quick

White Pine Doors, 2 ft. 8 in. x 6 ft. 8 in., 1 3/8—4 panel. Strictly "A" quality, each	\$1.86
Yellow Pine Doors, 2 ft. 8 in. x 6 ft. 8 in., 1 3/8—5 panel. Strictly "A" quality, each	2.01
Windows, 4 lts., 1 3/8, glazed, 10x20, SS, each	.77
Windows, 2 lts., 1 3/8, glazed, 16x20, SS, each	.70
Window Screens, 2 lts., 16x24, each	.64

Yellow Pine Base Moulding, size 1 3/16x2 1/4 in., per 100 lineal feet	\$0.96
Lattice, per 100 lineal feet	.36
Yellow Pine Cove Moulding, per 100 lineal feet	.33
Outside Window Frames, complete, for 10x20, 2 lts., each	1.25

We Carry as Regular Stock What Planing Mills Must Make

Made-to-Order prices always are high! What planing mills must make to order we carry as regular stock.

Hence our prices are a mere fraction of those commonly asked for Doors, Windows, Casements, Sash, Stair and Porch Material, China Buffets,

Mantels, Grills, Consoles, Colonades, French Windows, Doors, etc., etc.

You can use our immense facilities like a private plant. Get all your "special" material at regular "stock" prices, save money and prevent disastrous delays.

GET THE BIG CATALOG! Get this wonderful new catalog now. Put our prices, quality and service to the test. More than 100,000 splendid homes have been built from our Millwork and Building Material. *Every item in all these buildings was ordered direct from the Catalog.*

This is now saving our customers over a million dollars a year.

Our catalog will help you do business with less money—**increase your bank account.**



Write for Grand FREE Millwork Catalog Today
GORDON-VAN TINE CO.
 650 Federal St., Davenport, Iowa

Please quote BUILDING AGE when writing to advertisers.



How will you finish the *inside* of the house?

That is just as important, if not more so, than the outside. The last touch of refinement in a home is properly finished wood-work.

If you want to see color suggestions that will appeal to you—if you wish to know exactly the right materials to use—where to use them—how to apply them; in short, if you want to add to your store of wood finishing knowledge—send for this free book.

"Modern Wood Finishing" will give you valuable suggestions

It is the finest treatise yet given to the trade on the subject. It is remarkably well printed in four colors, shows finished wood in natural colors, has forty-eight illustrations, and is easily readable throughout.

It will give you convincing proof of the wonderful superiority of Bridgeport Standard Wood Finishes.

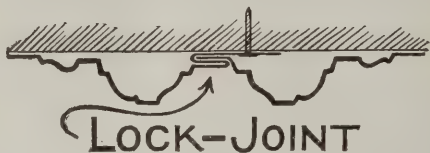
We have your copy. Shall we send it? A postal card will bring it.

The Bridgeport Wood Finishing Co.
New Milford, Conn.

New York

Boston

Chicago



There's one kind of ceiling that's safe to install.

The Kinnear Steel Ceiling

Overhead or on wall. Has been tested for years: the demand has increased, in Northland, Southland, and all through the East.

Our Quad Lock or Interlocking Slip Joint plates, borders and cornices will meet all requirements.

Catalog upon request.



No. 295 Quad Lock.

We will show you designs enough from which to select; you will be pleased with our new patterns and our prices.

The Kinnear & Gager Mfg. Co.

Boston: 125 Broad Street

Factory: Columbus, Ohio

Saw Set," which has an adjustable side gauge to bring the point of each tooth under the anvil, and a top clamp screw to regulate the amount of the set. The wearing surfaces are made of hardened tool steel and the device is claimed to embody every practical common-sense feature. Mr. Smith suggests to carpenters that they take advantage of the parcel post delivery and send \$1 for this saw set.

Charles M. Thomas has just opened an office at Clinton, Ind., for the practice of architecture and desires to receive catalogues of manufacturers of goods likely to be of interest to him.

S. H. Pomeroy Company, Inc., manufacturers of hollow metal windows approved by the National Board of Fire Underwriters, has just occupied its new factory at 282 to 296 East 134th Street, and has opened a sales office at 1123 Broadway, New York City. With its improved facilities the company places itself in a position to meet its constantly growing trade with greater promptness than ever before.

Many of our readers, especially the carpenter and builder, will be interested in much that appears in the Tool Chest Catalogue of C. E. Jennings & Co., 42 Murray Street, New York City, embracing as it does a wide range of tool outfits, tool chests and cases. Some of these are of a type to remind one of a suit case, so convenient are they for carrying tools about from one job to another.

Denison Fireproofing Company, Mason City, Iowa, is sending out a very interesting folder setting forth the merits of the Denison-Nolan Two-Way Tile Floors. Reference is made to the saving in dead load, in cost and in floor depth by the use of this tile and spans and wide spacing of columns are made possible. The two-way tile floors are referred to as being sound-proof, which is a highly important feature in schools, libraries, hospitals, residences, office buildings, etc. The folder carries illustrations showing two-way tile laid out ready for pouring concrete, also two-way reinforced concrete and hollow tile floors with views of an all-tile ceiling shown on the underside of slab.

One of the very interesting exhibits at the recent Pennsylvania Retail Hardware Show in Pittsburgh was that of the Universal Portland Cement Company, Chicago, Ill. To the casual observer a cement exhibit at a hardware show may seem somewhat out of place, but when one realizes that in the Pennsylvania towns cement is handled by the hardware dealers and not by the lumber dealers, as in most states in the West, a suitable display seems very much in season.

"The Universal Danger Sign" is the title of some interesting comments which appear upon the first page of the March number of the "Lightning" Line, the house organ of the J. A. Fay & Egan Company, 221 to 241 West Front Street, Cincinnati, Ohio. The point is made that the prevention of accidents is a duty of and a benefit to all; that few accidents would ever happen if preventive appliances were always used or a clear warning given. It is, therefore, suggested that use be made of mechanical safeguards wherever possible and for warnings to use the universal danger sign, which is a large red ball. The leading article in the issue in question is "Willful Lumber Waste in the United States." Another deals with preventive appliances, while others relate to matters of interest to those using woodworking machinery. The statement is made in connection with other matters that in order to facilitate the work of the carpentry department in making repairs and alterations for the tenants of its numerous buildings, the Metropolitan Building Company, Seattle, Wash., recently installed a No. 62 Universal Woodworker, a No. 2 Centennial Surfer and a No. 187 Double Circular Saw of the Fay & Egan manufacture.

The Ransome Concrete Machinery Company announce the establishment of a Buffalo agency at No. 4 Builders' Exchange Building.

In the very neat and attractive catalogue of the Hanna Mfg. Company, Troy, N. Y., is shown its regular line of engineering instruments with accompanying descriptive text. A vast amount of information is given and the matter is arranged in a way to be of special interest to those having occasion to use instruments of this character. Among the goods shown is an architect's level equipped with tripod, mahogany case, etc., and weighing complete only 6 lb. It has a rack and pinion movement to the object glass slide and is provided with an adjustable eyepiece for focusing the cross hairs. The company has its own foundry which permits personal attention to the metal mixtures and enables it to obtain the highest quality castings as to material of great durability, rigidity and wearing requisites. Owing to the superior construction of the instruments the company points out that they are maintained at the lowest possible expenditure for repairs.

(Continued on page 48)

PETE SAYS

ONCE in a while tools get tired—just as we do—they lose their edge—refuse to cut—all they need is a little freshening up on a

CABORUNDUM NIAGARA GRINDER

They are great little machines—easy running—strong—powerful—mechanically right—they won't rattle loose after a few days' use—and they are equipped with a

CARBORUNDUM GRINDING WHEEL

The cleanest, quickest, coolest cutting wheel I know of—they cut just like the Carborundum Sharpening Stones. A couple of Carborundum Stones and a Niagara Grinder is a great sharpening combination for any carpenter.

No. 1 Wheel, price, complete, ... \$2.50

No. 2 Wheel, price, complete, ... 3.50

No. 3 Wheel, price, complete, ... 5.00

No. 4 Wheel, price, complete, ... 8.00

YOUR HARDWARE MAN SELLS BOTH

The Carborundum Company
Niagara Falls, N. Y.



USE "NIAGARA" BUILDERS' SPECIALTIES



"Niagara" Metal Specialties for builders stand unrivalled. We show some of our characteristic products herewith.

Fig. 1 shows our 12" x 1-3/16" Single Width Tie for stone, brick or concrete block walls, having an average breaking strain of nearly 2,000 lbs. We make a double width tie twice the strength. Metal ties are the backbone of a wall, and Niagara ties embody the principles of the keystone and offer greater resistance than any other tie. All are galvanized to insure their continuous usefulness.

Figs. 2 and 3 show

Niagara Wall and Veneer Ties or Brick Bonds, having an average breaking strain of 1,000 lbs. each.

Figs. 4 and 5 show the parts of our "Symplis" Sash Fixture, all steel, simple, inexpensive and absolutely secure.

Figs. 6 and 7 show our perfect-working Niagara All Steel Sash Pulley and Premax Sash Chain, while Fig. 8 shows our Niagara galvanized Wall Plug for nailing securely to brick, stone or concrete walls.

Folder 57 A and free samples to interested parties on request.



Fig. 1.



Fig. 2



Fig. 3

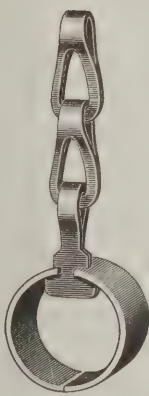


Fig. 4

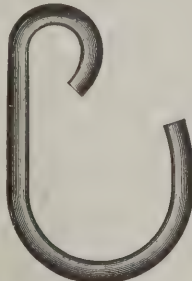


Fig. 5



Fig. 6

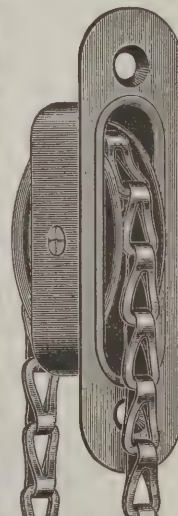


Fig. 7

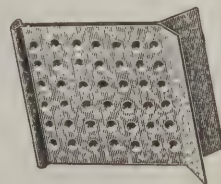


Fig. 8

S-26

NIAGARA FALLS METAL STAMPING WORKS

Niagara Falls, N. Y., U. S. A.

SITUATION WANTED

By a carpenter who has been with one builder 8 years, and with present builder 1 year. Is a graduate (building construction course) Drexel Institute, Phila., Pa., has acted as a foreman and has had experience at drawing plans, is desirous of employment in BUILDER'S ESTIMATING ROOM where he can work his way up to an ESTIMATOR. Has had a little practical experience at estimating but not enough to warrant him success as an estimator. Willing to start at moderate wages. Go anywhere. Reference furnished. A. J. GARDENER, 318 15th St., Chester, Pa.



HANNA QUALITY ENGINEERING INSTRUMENTS

BEST IN THE FIELD.

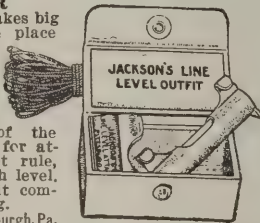
Reconnaissance Transit No. 50 shown herewith has compound socket. Graduations on solid silver. Lense system—the ACOME of perfection. Send for catalog.

Transit No. 50
Price, \$115

THE HANNA MFG. CO., Troy, N. Y.

A UNIQUE TIME SAVER

The Jackson Aluminum Line Level makes big saving of time and labor. Takes the place of the old-fashioned sixteen foot straight edge. May be carried in vest pocket. No contractor, builder, carpenter, etc., can afford to be without. Stretch line and hang the level on it—It's positively accurate. Complete outfit goes into neat leatherette case and consists of the level with 40-ft. line also spring clamp for attaching level to steel square or pocket rule, thereby serving as a plumb rule or bench level. Ask your dealer or send \$1.00 for outfit complete post paid. Send for Tool Catalog. J. Woodwell Co., Sole Agts., 201-203 Wood St., Pittsburgh, Pa.



Safeguard Your Door Bottoms



The Introstile (automatic) ends all under-door troubles. Closes the crack, no binding. Write for information.

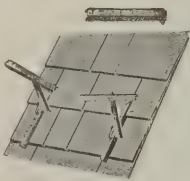
Introstile & Novelty Co.
Marietta, Ohio

Parkhill's New Universal Pitch Gauge

marks more Roof-framing in less time than any other tool or method. More pitches in the framing for each pitch. All given by other tools, also both bevels on plancher, fascia, sheathing and purline; hip backing; octagon and irregular hips and jacks; hopper bevels, etc. Gauge and directions are so simple, easy and exact that even the most unskilled framers can mark all cuts, lengths, etc.—22 for any one pitch of 100 in 5 minutes. Other tools use over 1000 figures, the Universal has 15 only. Fits any square. Unexcelled as stair and brace gauge. Prepaid for \$1.50. Money back if returned. Agents wanted.

John Parkhill, Rochester, Minnesota

SEND \$3.50 for a DOZEN of these ADJUSTABLE ROOF BRACKETS



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The Kinnear & Gager Mfg. Company, Columbus, Ohio, calls the attention of architects, builders and homeowners generally to the fact that the Kinnear steel ceiling with its lock joint is the kind of ceiling that is perfectly safe to install. Its merits have been practically demonstrated for years and the demand throughout the country has shown a constant increase. The claim is made that its Quad Lock or interlocking slip joint plates, borders and cornices are such as to meet all requirements. A catalogue which the company has issued shows in attractive style some of the many designs which are available and a copy of it will be sent to any architect or builder upon request.

"Contractors' and Builders' Accessories" is the title of a very handy little booklet issued by the Canton Foundry & Machine Co., Canton, Ohio, describing and pricing self-locking, burglar-proof coal chutes, coal doors, side-walk doors, illuminated or otherwise; illuminated and plain coal hole covers and rings; cast iron conductor connections and boots; cast iron door and window sills, stair treads and risers, columns and base plates, etc. As this booklet makes reference to the latest improved designs of the specialties referred to, builders and contractors will find it useful for reference.

A. J. Wilkinson & Co., 180 to 188 Washington Street, Boston, Mass., state that one of the important features of its folding and adjustable handle draw knife is that it may be used in awkward places where the ordinary knife would not be of service. The claim is made that this draw knife is absolutely rigid when set, that it is made of the best cast steel, and is offered in five sizes, ranging from 6 in. to 9 in.

Chain Belt Company, Milwaukee, Wis., presents in the March issue of "Chain Belt"—its house organ—some interesting information about concrete work and chain belt concrete machinery. Reference is made to an 8-story concrete building just completed in Milwaukee in 65 days in which there were 1,000,000 ft. of floor space concreted and in doing the work a Chain Belt concrete mixer was constantly in use. The contractor states that he had previously used the mixer for a year and a half without any breakage or necessity for repairs.

Northrop, Coburn & Dodge Company, 43 Cherry Street, New York City, calls attention to the fact that its Tile Booklet presents much that is of interest regarding its metal tiling for walls and ceilings of bath rooms, kitchens, bakeries, butcher shops, etc., etc. A copy of the booklet will be sent to any reader of *The Building Age* who may make application for it.

The Heppes Company, 1011 Forty-fifth Avenue, Chicago, Ill., points out that its Flex-a-Tile Asphalt Shingles are surfaced with chipped slate and granite in rich natural colors in green and red. The claim is made that these shingles are as handsome as tile, as durable as slate, as inexpensive as stained wood shingles, and much easier to lay than any of them. A free sample may be had by any builder who will send for one.

Chicago Millwork Supply Company, 1424 West Thirty-seventh Street, Chicago, Ill., is offering to readers of *The Building Age* who may make application for them copies of Book No. 55 giving plans of barns and houses and also Catalogue No. 45 dealing with building materials. The point is made that the books show the way to great economy in house construction and in building and repair work are a most valuable price guide.

Benjamin-Sellar Mfg. Company, 557 Quincy Street, Chicago, Ill., tells carpenters and builders how they can add profits on every job. One is to use the screen door catch which it manufactures and which holds the door closed tight; another is to install a ventilating window lock which it is pointed out every window in every house requires. Special leaflets and prices which the company has ready for distribution can be obtained by any reader who is interested.

What may be considered as an entirely new use for a sheet metal product has just been discovered by Adolph Melzer of Evansville, Ind., who has given to the city \$1,000 to be deposited with one of the banks at 4 per cent. compound interest. This sum is to remain in the bank for 250 years, at the end of which time the principal with accrued interest is to be turned over to the city of Evansville. The question naturally arises as to the keeping of the certificate and the preservation of the phonographic record which will contain the voice of the giver. The problem was solved by Mr. Melzer finally specifying for his unique purpose rust-resisting anti-corrosive Toncan metal. He, therefore, placed his order with the Stark Rolling Mill Company, Canton, Ohio, and the tubes will be made of this metal and then silver plated, after which they will be placed in the vaults of the city for safe keeping until the year 2162.

	23	22	21	20	19
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"	OF HIP OR	VALLEY	RAFTER	PER FOOT	RUN
DIFFERENCE	IN LENGTH	OF JACKS	16 INCHES	CENTERS	
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Chester, Conn.

THE BUILDING AGE

NEW YORK, MAY, 1913

A RAILROAD STATION FOR THE SUBURBS

A Design Executed in Red Brick and Stucco with Roof
of Light Green Tile

THE tendency toward the artistic in architectural treatment and surroundings, whether it be in connection with the private dwelling, the industrial structure, or the public building, is becoming more and more pronounced each year that passes, but it is perhaps seen most strikingly in the great advancement which has been made in recent years in the style and character of the suburban passenger stations which

the line of road along which they are to be found.

It is our privilege this month to present to the attention of the readers of *The Building Age* a most attractive example of a suburban railroad station in Eastern Massachusetts constructed of red brick below the belt course and finished with stucco above, while the roof is of light green tile. Views of the completed structure as well as an interior of the waiting room



A Railroad Station for the Suburbs—Photographic Perspective of the Building as Viewed from the Track Side

are to be found along the lines of many of the leading railroads of the country. Here one may see examples of neat and attractive architecture arranged with careful regard to the needs of the community, and in many instances the surroundings are beautified by means of flower beds and grass plots which are maintained upon the same plane of excellence as would be the elaborate landscape gardening in connection with a costly country estate. The stations themselves are of the most modern construction, substantially built and constitute ornamental as well as useful features of

are shown upon this and the pages which follow, while the plan and details clearly indicate the arrangement of the floor space and the constructive features. It will be seen that in addition to the general waiting room there are two toilet rooms with provision for heating both; post office boxes, a drinking fountain, ticket office, baggage room, boiler room, etc.

Upon the floor plan there is also indicated by means of dotted lines the hips and ridge of the roof.

All footings and walls, as well as the foundations for the platforms, are of concrete mixed in the propor-

tion of one part cement to three parts sand and five parts broken stone and gravel.

The entire area of the first floor and the granolithic platforms were first leveled off and the earth thoroughly wetted and tamped, after which it was covered with a layer of clean gravel 8 in. thick. On this gravel was placed a layer of concrete 4 in. thick and the first floor finished with a top dressing composed of cement, quartz, sand and crushed granite screenings in the proportion of one part of each.

The timber throughout the building is of seasoned spruce, the ceiling joists being 2 x 8 in. placed 20 in. on centers and supported from rafters over large spans with 1 x 6 in. spruce braces as shown on the sectional view every sixth joist. The plate is 4 x 4 in. spruce, the studding 2 x 4 in. placed 16 in. on centers; the rafters 2 x 8 in. placed 20 in. on centers; the ridge 2 x 10 in., and the hips 3 x 10 in. All ceilings throughout are

is composed. The hip rafters are reinforced with 2 in. thick white pine of the same depth as the rafters, and are bolted and spiked to them extending down to the gutter.

The chimney has 8 x 12 in. terra cotta flue lining running its entire height, the flue being enclosed with an 8-in. wall starting from a concrete foundation.

All door sills are of Westerly granite and all limestone is ten-cut work.

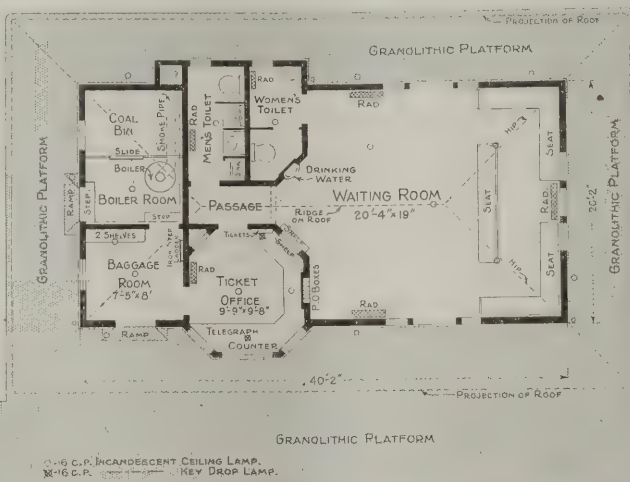
The waiting and toilet rooms, as well as the ticket office, are wainscoted 3 ft. 8 in. high with Keene's cement, the scratch and brown coats being of gray tint and the finishing coat of pure white.

The flashing and counter-flashing

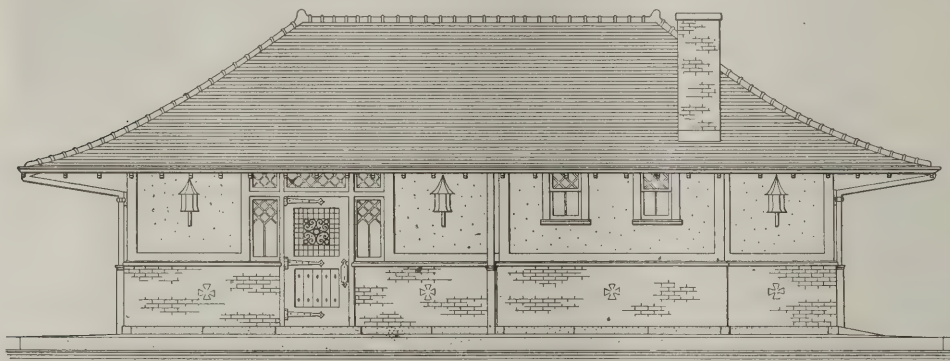
around all outside door and window openings as well as window sills and chimney are of 20 oz. copper. There are three galvanized iron rain water leaders connecting with galvanized iron gutters and discharging into a 4-in. cast-iron pipe.

The windows have the usual box frames for weights with pockets and all hanging sash are hung with weights and sash chain over 2½-in. noiseless bronze faced axle pulleys. The outside windows of the ticket office are fitted with casement sash to swing in and are protected by wrought iron guards. All sash throughout are glazed with best qual-

ity double thick American glass. The interior doors, except entrance doors and transoms, are glazed with figured, obscure glass made by the Mississippi Glass Company, 115 Broadway, New York City. The entrance doors are glazed with first quality American



A Railroad Station for the Suburbs—Ground Floor Plan—Scale ¼ In. to the Foot



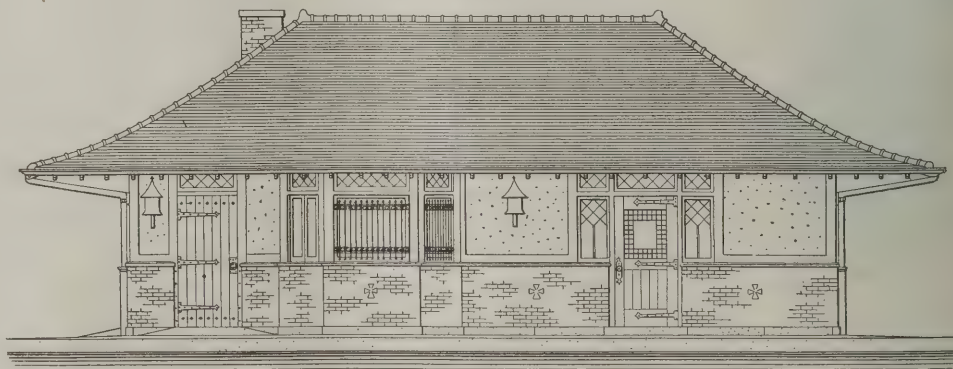
Street Elevation—Scale 3/32 In. to the Foot

furred with 1 x 2 in. spruce strips spaced 16 in. on centers.

The exterior walls of the building between grade and the belt course are of hard burned Harvard brick laid Flemish bond with joints ¼ in. thick. The base course around the building and the chimney cap are of light buff Indiana limestone.

Above the belt course the exterior walls are treated to two coats of clean, sharp sand and rich lime mortar mixed with a proper proportion of Portland cement and ox hair and applied to metal lath. The finishing coat is what is known as "pebble dash," and is composed of fine, clean washed gravel, mixed with pure lime and water. It was thrown on the plastered wall in a semi-fluid state with a wooden float, the work being done by men skilled in this kind of finish.

The main roof is covered with North Carolina pine boards 6 in. wide laid with close joints and to the roof boards are fastened 1 x 2 in. pine nailing strips placed 12 in. on centers to support the tile of which the roof



Track Elevation of Station—Scale 3/32 In. to the Foot

plate glass. Ticket window is of heavy leaded glass.

The doors opening from the waiting room into the ticket office and into the men's and women's lavatories are glazed and provided with transoms.

The iron step ladder shown on the plan against partition wall in the baggage room leads to a 2 x 3 ft. hatch with door overhead.

All woodwork throughout the interior of the build-

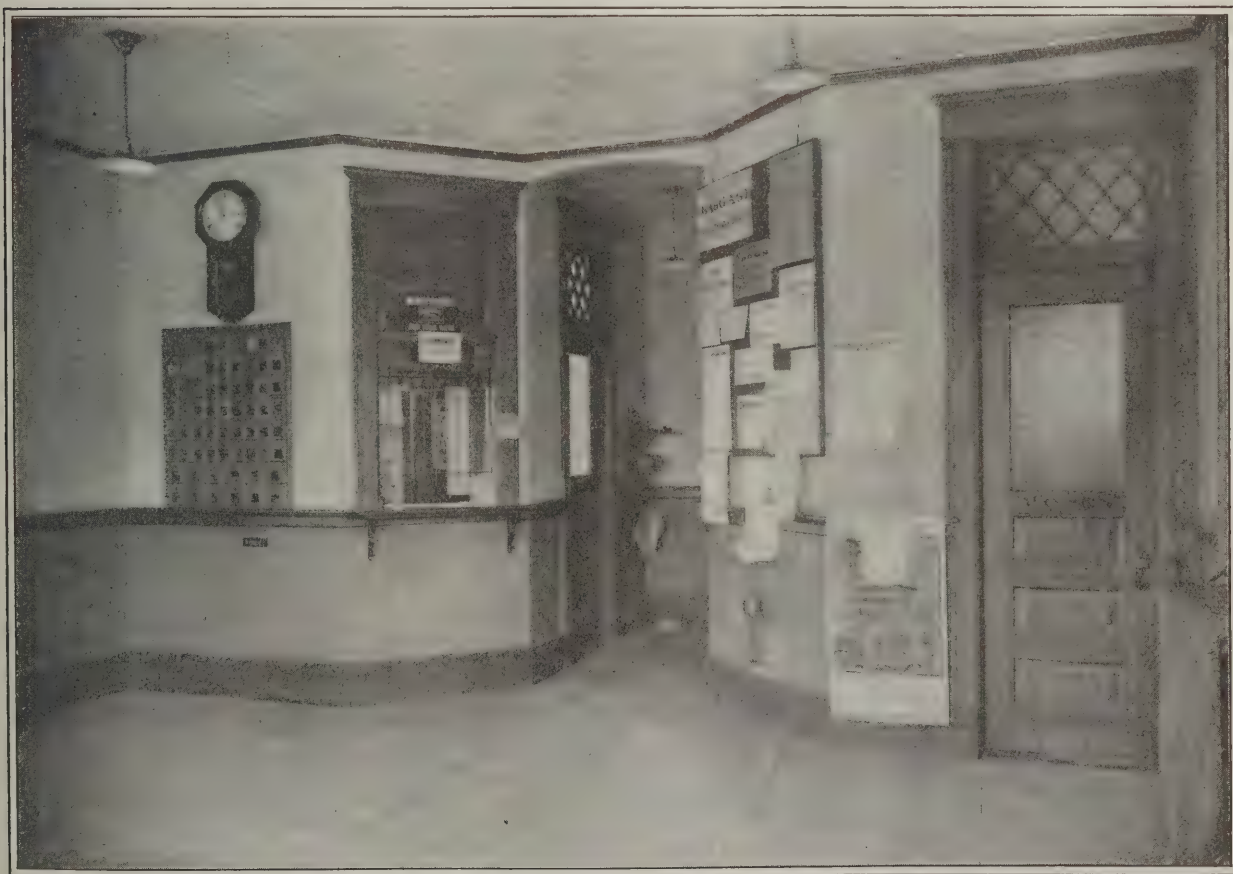
ing excepting the baggage room is of North Carolina pine. The side walls of the baggage and boiler rooms are wainscoted to the window sills with planed, matched and beaded North Carolina pine $\frac{7}{8}$ in. thick and not more than 3 in. wide.

The toilet room partitions are matched and beaded North Carolina pine $\frac{7}{8}$ in. thick and not more than $2\frac{1}{2}$ in. wide. The posts are supported on nickel-plated legs fastened to the floor.

The outside entrance doors to the waiting room are



Photographic Perspective Showing Appearance of the Railroad Station from the Street



A Railroad Station for the Suburbs—View in Waiting Room Looking Toward the Ticket Office

The counter, cupboard drawers and shelves of the ticket office are of ash, doweled and glued and put together in a thorough manner. The window and door trim are $5\frac{1}{2}$ in. wide. The vertical trim is $\frac{7}{8}$ in. thick and the capping on top of the trim is $1\frac{1}{8}$ in. thick.

2 in. thick, glazed with plate glass and have wrought iron grill. The outside doors of the baggage room are 2 in. thick built in two thicknesses. The doors to toilets, ticket office, etc., are $1\frac{5}{8}$ in. thick, while closet doors are $1\frac{1}{2}$ in. thick of the panel type as shown in the details.

All exterior woodwork has three coats of white lead and linseed oil and all metal work has three coats of paint.

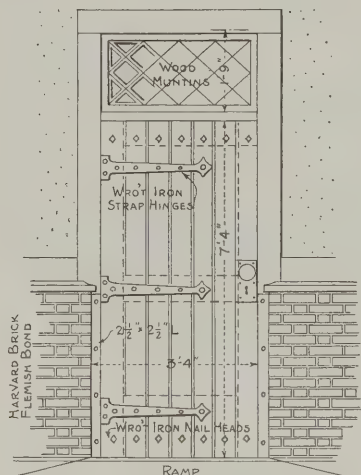
The entire woodwork in the waiting room, ticket office, toilets and the North Carolina pine in the baggage and boiler rooms has one coat of liquid filler and two coats Edward Smith & Co.'s "L.X.L." No. 1 rubbed down to a neat finish.

The hardware is of the Russell & Erwin Mfg. Com-

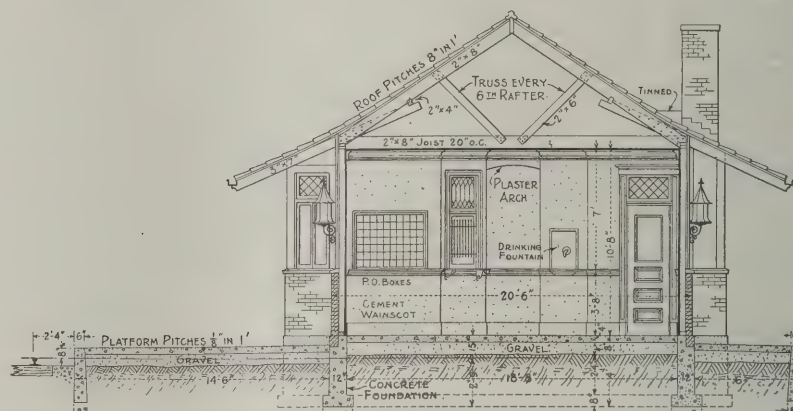
hot water radiation. The radiators are of the Tremont pattern and wherever the pipes pass through floors, walls or ceilings they are enclosed in galvanized tubes flanged at both ends. All exposed piping outside of the heater room as well as the radiators are bronzed.

The station here illustrated and described is at "Charles River," which is near Needham, Mass., the place being known locally as "Charles River Village."

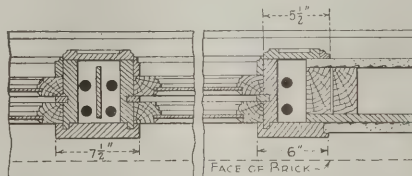
The plans were drawn by the architectural force



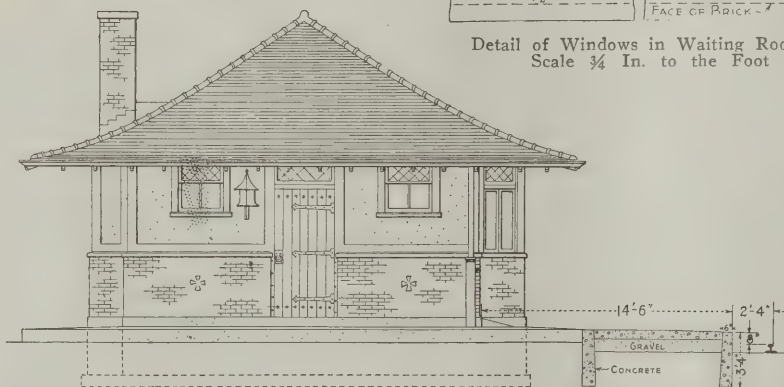
Elevation of Door to Baggage and Boiler Rooms—Scale $\frac{1}{4}$ In. to the Foot



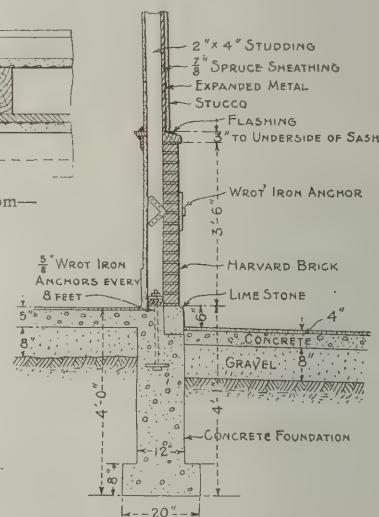
Vertical Cross Section of Building Taken on a Line Through the Waiting Room and Looking Toward the Ticket Office and Toilet Room—Scale $\frac{3}{32}$ In. to the Foot



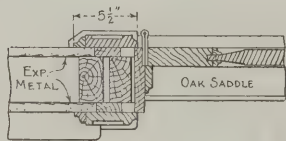
Detail of Windows in Waiting Room—Scale $\frac{1}{4}$ In. to the Foot



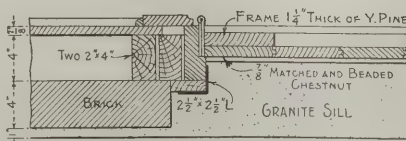
End Elevation Showing Door to Boiler Room—Scale $\frac{3}{32}$ In. to the Foot



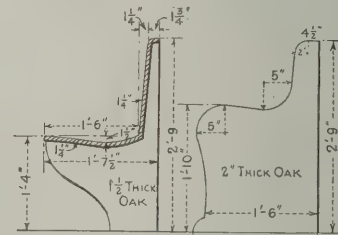
Section Through Foundation Wall—Scale $\frac{1}{4}$ In. to the Foot



Detail of Door Trim in Waiting Room—Scale $\frac{1}{4}$ In. to the Foot



Horizontal Section Through Door and Frame of Baggage and Boiler Room—Scale $\frac{1}{4}$ In. to the Foot



Section Through Seat in Waiting Room, Also End View—Scale $\frac{1}{4}$ In. to the Foot

A Railroad Station for the Suburbs—Elevations and Various Constructive Details

pany's make. The post office lock boxes shown in the partition between ticket office and waiting room are fitted with Yale & Towne locks.

Italian marble is used in connection with the plumbing fixtures and the basin slabs are countersunk and molded. The fixtures in the toilet rooms are of the make of F. W. Webb Mfg. Company, Boston, Mass.

In the waiting room is a drinking fountain having marble sides, back and base.

The station is heated by a Gurney hot water boiler having a total heating capacity of 1250 sq. ft. of direct

employed by the New York, New Haven and Hartford Railroad Company, New Haven Conn., under the direction of Edward Gagel, chief engineer for the road.

How Farmers Build Block Silos

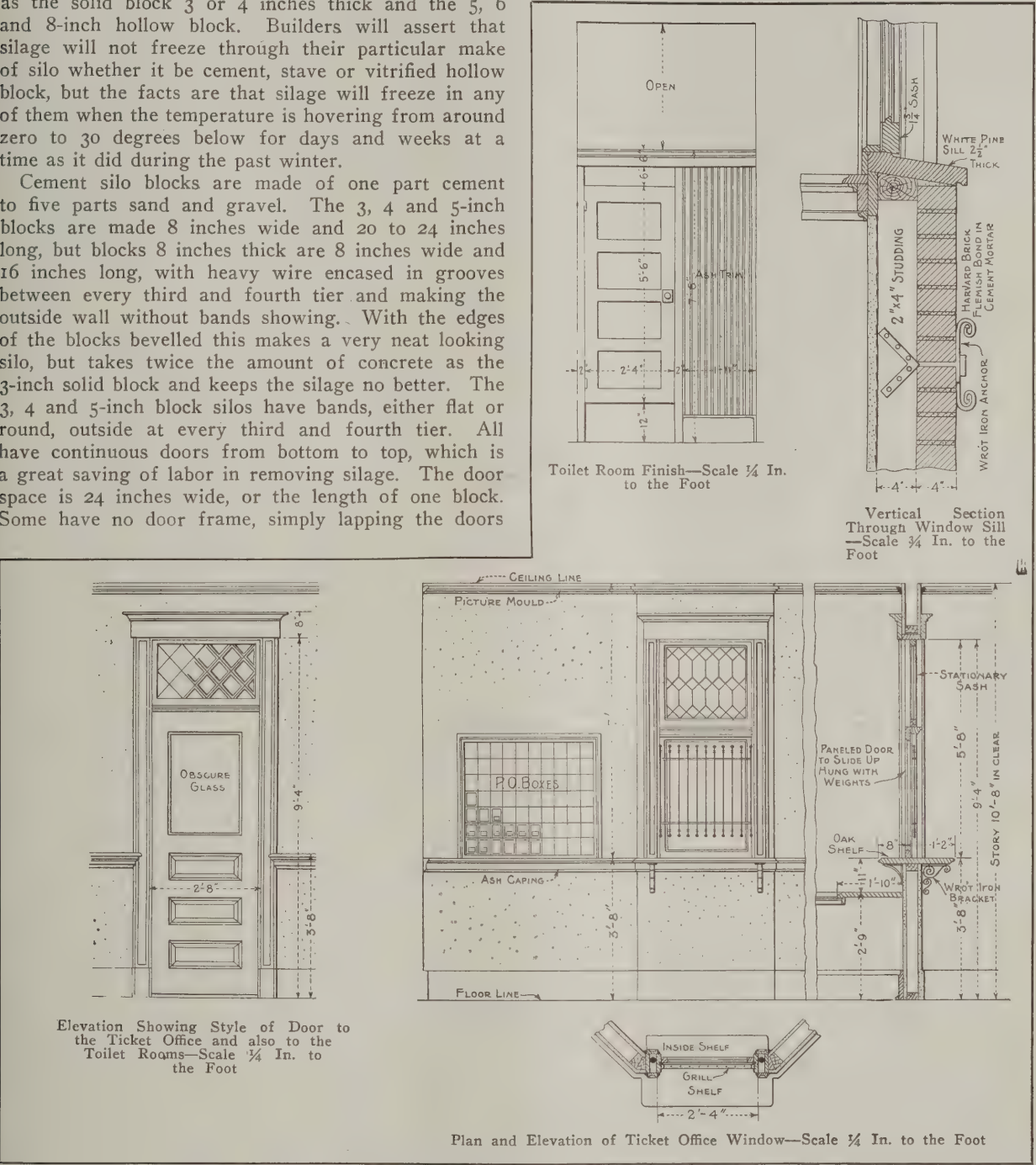
The light in which dairy farmers regard the silo and the way they go about it in a section of the country noted for its enterprise in this line is shown by

the following extracts from a letter by Wells Parrish of Ottawa County, Michigan, which appeared in a recent issue of the *Breeders' Gazette*. After pointing out that there are more cement silos in that county than in any other in the state or probably many counties in the world, he says:

There are several different styles of these silos built. A few are building the solid concrete wall reinforced with steel, but it takes more material than some others. In the cement block silos we have different styles, such as the solid block 3 or 4 inches thick and the 5, 6 and 8-inch hollow block. Builders will assert that silage will not freeze through their particular make of silo whether it be cement, stave or vitrified hollow block, but the facts are that silage will freeze in any of them when the temperature is hovering from around zero to 30 degrees below for days and weeks at a time as it did during the past winter.

Cement silo blocks are made of one part cement to five parts sand and gravel. The 3, 4 and 5-inch blocks are made 8 inches wide and 20 to 24 inches long, but blocks 8 inches thick are 8 inches wide and 16 inches long, with heavy wire encased in grooves between every third and fourth tier and making the outside wall without bands showing. With the edges of the blocks bevelled this makes a very neat looking silo, but takes twice the amount of concrete as the 3-inch solid block and keeps the silage no better. The 3, 4 and 5-inch block silos have bands, either flat or round, outside at every third and fourth tier. All have continuous doors from bottom to top, which is a great saving of labor in removing silage. The door space is 24 inches wide, or the length of one block. Some have no door frame, simply lapping the doors

with stone and concrete. After the wall has set we dig out the inside case down at the bottom of the wall. Draw a circle on the wall the size of the silo, and set up 2x4's for the ends of the blocks to butt against in the doorway. Any mason can do the work, and many a young man here after helping one or two seasons will be head man after that and do good work. One should build two or three courses of blocks above where he wants to put in hoops, and be careful not



A Railroad Station for the Suburbs—Miscellaneous Constructive Details

about 3 inches on the inside of the wall, and the same distance on each other. Doors are made of two thicknesses of flooring with tarred paper or roofing between. We place a strip of wood 1¼ x 4 inches back of each hoop between the ends of the blocks to take up the strain in tightening the hoops, and to serve as a ladder. For the foundation we dig a trench 20 or 30 inches deep or to solid earth; 8 or 10 inches wide at the top and about two feet wide at the bottom; then fill this

to draw the hoops too tight, as it might start the blocks from the mortar. One should put the ladder strip back of the hoop at the door before tightening. When it is tight enough it should never be touched again. The scaffolds are always built inside of the silo. Some set up four long poles, nail on cross pieces, and move the plank up as they work to the top, and take off lengths as they plaster down after the blocks are laid. Others set up four 2x6's on end and use lines and pulleys to draw each corner of the scaffold up,

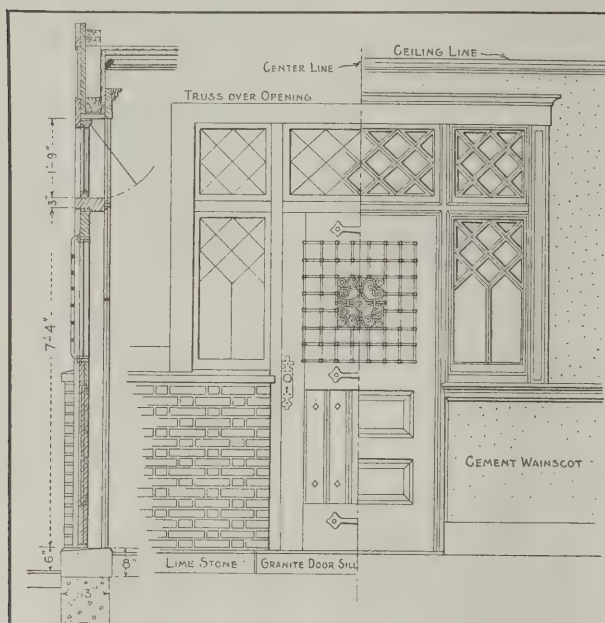
always using bolts when in place to avoid accidents. The more modern scaffold is made with one string center post made in sections to the proper height, using blocks and line to raise or lower, and bolting in place until moved again.

When making blocks place $\frac{1}{2}$ -inch bolts in six blocks, letting the thread ends project $2\frac{1}{2}$ inches. These are put in the top tier to bolt the plates to. We lay the blocks in good cement mortar with one-third or one-fourth lime added, so it will not set too quickly, and use good sharp sand. As the blocks are laid one should point up well on the outside as he goes up, and plaster inside as he goes down, putting on one part cement and two parts sharp sand $\frac{1}{4}$ -inch thick. After the silo has dried four or five days make a cement wash consisting of cement and water to the thickness of cream, keep well stirred and apply with a whitewash brush. A fresh

spring. Hundreds of cement silos were erected this summer in Michigan. What is good for our state is good for any state that has good cement and gravel.

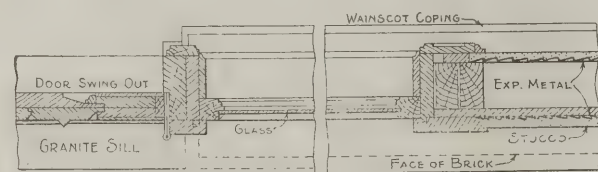
Winner of the Prize Cottage at the Recent Clay Products Exhibition

As intimated in our last issue in connection with the prize brick house erected in the Coliseum and on exhibition during the second annual Clay Products Exhibition held in that place the winner of the cottage was to be the person who guessed the nearest to the number of marbles contained in a jar. The result of the contest showed that John Mulligan, 400 Webster Avenue, Chicago, Ill., won the house by guessing the exact number of marbles in the jar, there having been

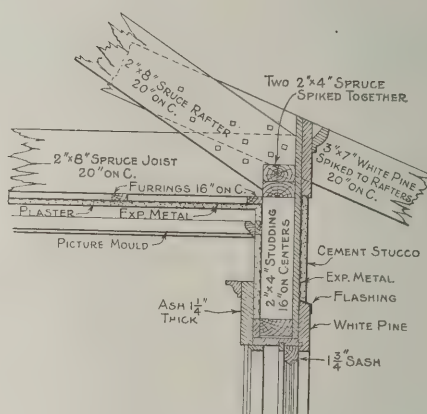


Transverse Section Through Ticket Office Partition—Scale $\frac{1}{4}$ In. to the Foot

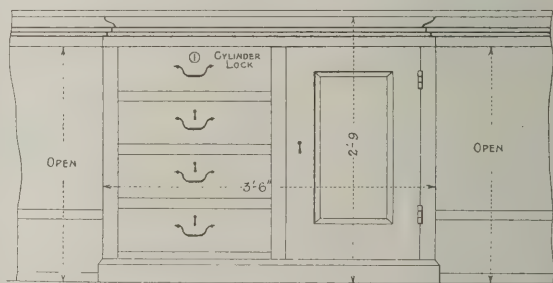
Section Through Entrance Door and Transom, Also Elevation Showing Outside and Inside Half of Door—Scale $\frac{1}{4}$ In. to the Foot



Horizontal Section Through Outside Entrance Doors in Waiting Room—Scale $\frac{1}{4}$ In. to the Foot



Details of Cornice and Window Head—Scale $\frac{1}{2}$ In. to the Foot



Elevation of Ticket Office Counter—Scale $\frac{1}{4}$ In. to the Foot

A Railroad Station for the Suburbs—Miscellaneous Constructive Details

wash should be applied once in four years. This will make a receptacle as good as a glass case to preserve corn in, and every pound will be good to the wall, providing there is moisture enough when it is put in. When the inside of the wall is dry one can take down the 2×4 's placed in doorway, as the doors will lap on the wall. The roof is easier to build after the silo is filled. There are many styles of roofs. I prefer the flat roof, as one can stand on it when putting up the blower pipe.

I have seen a 12×32 -ft. silo erected, angle iron door frame put in, plastered and hoops on in two and one-half days by two masons and three common helpers. A silo 12 ft. inside diameter and 30 to 36 ft. high costs completed from \$125 to \$150 and more or less according to the size and nearness to good gravel. Thousands of loads of gravel were drawn from the pits the past winter, and many farmers made their blocks last

5,377 by actual count of the committee in charge.

We understand that with the prize cottage is also given a \$1000 lot on which it is to be erected.

The exact duplicate of the cottage together with a \$1000 lot was awarded to Daniel Moloney, 1219 South Troy Street, Chicago, as the result of a popular voting contest conducted by the Chicago Examiner, he receiving 2,766,280 votes.

The Fourth International Congress of School Hygiene is to be held in Buffalo, N. Y., August 25 to 30 of this year. It is stated that the citizens of Buffalo have raised a fund of \$40,000 for the purpose, and that delegates will attend from the leading educational institutions in America and Europe. An important feature of the program will be the discussion of sanitary provisions for heating and ventilation of school buildings.

A PRIZE-WINNING KITCHEN ARRANGEMENT

A Plan Which Was Awarded the Prize in a Contest for an Ideal Kitchen—Details of the Equipment

IN the planning of houses the kitchen does not always receive the attention at the hands of the architect which its importance would seem to warrant, but the



subject of kitchen arrangement is one of never-ending interest. In order to draw out the views of those well qualified to judge of what constitutes the ideal kitchen in a

modern suburban home the management of Suburban Life recently conducted a contest offering a cash prize for the best plan and description of an ideal kitchen. The arrangement selected by the judges is illustrated in the accompanying plan and we publish the descriptive text which accompanied it.

A suburban kitchen, to be ideal, must be practical. The word practical calls up a vision of many things, not the least of which is an arrangement that is pleasing to the eye. In fact, the kitchen should be the most delightful and charming room of the home.

The group of rooms composed of the kitchen proper, china-pantry, or "servery," storeroom, laundry, also rear porch, is the workshop of the home, and should be considered together.

That there may be good light and ventilation, as well as ample space in which to turn around, I have planned the dimensions of my ideal kitchen to be 13 by 16 ft.

The windows are to extend almost to the ceiling, furnishing a means of ventilating the upper stratum of air; a very essential point, often carelessly overlooked. The windows and doors are to be so arranged that there will be an excellent cross-draft. The upper half of the outside door will be of glass. Above the door will be a transom easily opened and closed.

Even though it be necessary to discard that all-important feature of a house—the living room, together with a couple of bedrooms, yet will I insist that the floors of my kitchen, pantry, storeroom and laundry be laid in tile. Also, that a tile wainscoting extend 5 or 6 feet, and a curved base tile be used at the angle between floor and wall, which will prevent accumulation of dirt and bid defiance to microbes.

Tile is a fireproof, permanent, non-absorbent, germ-proof material that is washable, rendering unnecessary laborious scrubbing—a veritable time and labor saver. It is absolutely necessary to a sanitary kitchen. Wooden floors, even though apparently presenting clean, bright surfaces, after several years' use will have absorbed foreign vegetable and animal matter, thus harboring myriads of bacteria injurious to human life. Many home builders overlook the importance of having non-absorbent, washable floors and walls in the kitchen, deeming that tiles are chiefly used on account of their decorative appearance and attractiveness.

For those who find the tile wainscoting too expensive, I would suggest a substitute that is frequently used in bathrooms, and which possesses almost as many desirable qualities as the more costly tile. This is a hard cement plaster, applied to metal lath and finished to a smooth surface, then blocked off to resemble

tiling. After drying thoroughly, it is given about two coats of white lead and oil paint and two coats of enamel paint—more if desired.

The upper part of the walls and the ceiling are to be covered with hard plaster, coated with washable paint. All woodwork is to be perfectly plain, together with interiors of cupboards and drawers, and all shelving first painted white, and then treated with a coat of white enamel.

The plan shows clearly the arrangement of the rooms and furnishings. A small serving pantry is desirable between kitchen and dining room as a precaution against cooking odors and noise. Here will be a built-in cabinet, with sliding glass doors, for china and glassware. At one end of the cabinet will be a cupboard for the extra leaves of the dining table. On the opposite side of the pantry there will be a cupboard for supplies, with a broad top to answer for a table, also shallow drawers to hold the knives, forks, spoons and strainers. On the pantry door, on the kitchen side, there will always be a fresh roller towel.

The storeroom will contain a built-in, porcelain-lined refrigerator, with door opening outside, so that the iceman may replenish the ice without entering the house; a dark closet, with shelves from the floor up, for preserves; swinging flour and meal bins, arranged under open shelves on which will be stored the groceries. I have given infinite care and thought to the



Plan of Prize-Winning Kitchen Arrangement

arrangement of the kitchen fixtures, so that the work may be reduced to the minimum. The cabinets, shelves, etc., are to be placed so that they will be within easy reach of the range and work tables. There must be ample space for utensils and supplies, yet not too much.

A hood over the gas and coal ranges will catch the steam and odors arising from the cooking foods, and will be carried off through a ventilating flue in the chimney. For a suburban home not supplied with gas, an alcohol stove would serve every purpose for warm weather. A fireless cooker is required in the modern kitchen, and space has been arranged for it.

A running water supply may be had in any suburban home, and at a cost usually very much less than is commonly supposed. I have provided for a porce-

lain sink, equipped with heavy wire dish drainer, to be placed convenient to the range. The average sink is set too low for comfort; it should be about 32 to 34 inches from the floor. I have learned never to put a cupboard under a sink. I will have, instead, a few hooks for utensils that are in constant use.

The high shelf at one end of the sink will hold a reliable clock, and an hour glass to time the eggs. A tier of shelves will be placed at the right-hand end of the sink for kitchen ware. Space here will be reserved for cook books, blank book, scratch pad and pencils for notes and accounts.

Near the rear door there will be a small marble topped table for the making of pastry. The top of the large center table will be of a composition recently placed on the market, on which can be put hot or dirty pans. The table legs will be on small rubber supports, which will keep the tables firm and prevent any sliding on the glazed tile floor. There will be a good comfortable chair and a stool. Tile floors are hard and, as a protection for the feet, I will have rubber or fiber mats in front of sink, range and work tables.

My kitchen will be supplied with the latest labor-saving devices—bread and cake mixers, egg and cream beaters, meat chopper, measuring glasses, a pair of scales, potato ricers, vegetable cutters, molds, glass jars for cereals, glass rolling pin, etc. The well-equipped, up-to-date kitchen comes nearer to solving the servant problem (which is indeed a problem to the suburbanite) than any other factor, and makes the housewife more independent should the cook leave; which, however, she will not be so likely to do.

An attractive color scheme will be the floor in white and green tile, wainscoting white, upper wall soft gray green (this is a very restful color to the eyes and soothing to the nerves), ceiling a delicate shade of green, so light as to be almost white. This will combine beautifully with the aluminum (silver) utensils, brown casseroles, and a few copper or brass pieces.

As my kitchen walls will be of a character and tone that will reflect light, there will be a great saving in light bills. The lights are to be placed so as not to blind the worker, as most kitchen lights do. If electric lights are not available, I will use alcohol lamps, which give a clear, steady, white light.

A window box will be built outside the two windows over the sink. Here will grow and blossom crimson geraniums, to bring a feeling of cheer to the worker.

Good rustproof screens will be placed in door and windows. It is not an economy to use an inferior quality of wire screening. There will also be good shades of a dark-green color at windows and glass door.

It is objectionable to have laundry tubs in the kitchen, so I have provided a laundry room just off from and convenient to the kitchen. A small cupboard placed at the end of the laundry tubs will hold the ironing board and laundry supplies.

A covered kitchen porch, latticed, will be a convenience and a summer delight. A servant's toilet opens on the porch, also a small closet for broom, mops and cleaning materials.

On the porch just outside the kitchen door, fastened to the wall, will be built a cold-storage box with several shelves, side and ends covered with wire gauze. This will be a good place for cooked foods or vegetables with an odor. In winter, perishable articles can be kept here, and will do away with the necessity of keeping ice.

William R. Mack, the well known manufacturer of the Barton Edged Tools in Rochester, N. Y., was instantly killed while crossing the tracks of the New York Central Railroad two miles east of Warner, in a blinding snowstorm on the afternoon of Friday, March 7.

Progress of the Panama-Pacific International Exposition

While the construction of the Panama-Pacific International Exposition, which will be held in San Francisco in 1915, is breaking all records in the perfection of its progress, arrangements are being made for innumerable conventions and conferences to meet at the Exposition in 1915.

Every trade and profession in the world will be represented in some form in the exhibit section of the Exposition and it is the intention of the Exposition authorities that similarly every trade and profession shall be represented in convocation. In the planning of the Exposition such ample provision has been made for the accommodation of conferences, that already hundreds of applications have been received from all parts of the world for dates to hold gatherings and festivals. The most notable of the conferences already arranged for are the International Peace Conference and the Convention of the Inter-Parliamentary Congress. Other conferences in the interest of commerce, public health, art and music are being arranged.

All buildings will be fully completed eight months before the opening of the Exposition. By August, 1914, many of the exhibits will have been installed and the ground terraced and planted with trees and flowers. Every detail of the Exposition will be perfected at least two months before the opening date.

The classification of exhibits, which has just been issued in complete form by Captain Asher Carter Baker, and which has been pronounced by experts to be the most comprehensive of its kind ever made, consists of 11 departments divided into 136 groups, subdivided into 800 classes.

How to Avoid Concrete Failures

The need of a better understanding of reinforced concrete is being strikingly demonstrated by the number of apparent failures reported in the recent past and in order that the dangers of incomplete requirements may be impressed upon the minds of those who prepare specifications, the American Bureau of Inspection and Tests has issued a pamphlet bearing on the subject. Reference is made to the fact that there are two classes of reinforced concrete failures; first, failures during construction, and, second, gradual failures seldom manifest before two or three years.

The failures of the first class are generally attributed to ignorance or inexperience on the part of owner, architect or contractor; bad weather conditions sometimes aggravate these avoidable reasons. Investigations often reveal such recklessness in design that the designer is charged with part of the blame. Design, however, is seldom the cause of a failure during construction. Removing the forms before the concrete is strong enough is the most common cause. Failures should be charged more generally to poor sand and aggregates. Owners should understand that concrete structures are something far different from buildings of wood or brick; they are engineering structures requiring a high degree of technical skill from the designing office to the issuance of the last certificate to the contractor.

The pamphlet in question presents interesting comments from some of the technical press touching concrete failures and some of the dangers of the practice of competitive commercial designing of reinforced concrete buildings.

The annual report of the Builders' Exchange at La Crosse, Wis., shows that plans of buildings aggregating a cost of \$2,000,000 were submitted to members for figures during the past year.

ECONOMY IN FARM BUILDING CONSTRUCTION

Problems Which Confront the Present-Day Designer of Farm Buildings
—Features of Framing—Its Strength and Rigidity

By L. H. HAND

IN the problem of designing buildings for farm use we are met at the very outset with two rather startling facts. The modern farm building to accommodate improved hay tools and shelter the increased supply of forage and provender required to maintain the farm animals to operate the various man labor-saving devices now in use on all large farms, necessitates the spanning of larger areas of roof and higher hay mows than when the hay crop was cut with a scythe and mowed away with hand forks. In the old days, however, in places where I learned my trade every farm had from 30 to 60 acres of virgin forest where it was easy to cut long straight timbers for barn frames of almost any desired length. When a farmer lacked a few or even all the timber for a "barn pattern" he could easily arrange with a neighbor to go into some tract that was soon to be cleared and cut such timber as he wanted.

To-day the same farms have probably not more timber than will supply fire wood and may be a few short saw logs, while many farms have not even that much.

Ordinary dimension stuff from the lumber yards is not nearly so good for farm buildings as hardwood. Even red birch, sugar tree and large sycamores make very fair framing material, while white and red oak are par excellence for barn work.

Stabling put up of pine is not durable, while a good stall and manger properly constructed of oak, birch or sugar tree will last a man's lifetime without repairs.

The present price of timber requires a large outlay of ready cash. The native timber means quite an outlay of labor when teams and men would otherwise be idle, but the cash outlay is small. Then, again, the dimension stuff from the yards is all very much under size of the normal figures, so that it is necessary to bill larger sizes of pine than of native timbers.

The 2 x 4-in. scantling from the saw mill is more often 2 1/8 x 4 1/4 in. than under size, while the 2 x 4-in. pine of commerce is apt to be 1 5/8 x 3 5/8 in., hence the native 2 x 4 is about equal in strength to two pieces of 2 x 4 pine or one piece of 2 x 6-in. pine.

But probably the most important feature of all is that many farmers prefer to do everything possible with the natural product of the farmer rather than to purchase something even better that has to be bought away from home. As a consequence the designer of modern farm buildings starts out with two problems:

first, a much better building than the old-fashioned barn, and second, a very limited supply of suitable material of which to construct the building.

The picture I am sending together with the detailed drawings are intended to illustrate a barn which I erected for R. J. White at Palestine, Ill. This barn, as it appears in the photograph, with the exception of the cement, bolts and nails, is made entirely of the product of the farm. The gravel for the concrete foundations only had to be hauled about 100 yards and all the framing material, roof, sheathing and lath for corn cribs were cut from such timber as was cleared off the fields.

This building is designed to meet the most urgent requirements of the farm for the present only, as it is Mr. White's intention to erect a similar structure 200 ft. long in the near future. I have given this building

very careful study so as to obtain the very limit of strength with a minimum outlay of material.

Except the floor joists across the driveway there is not a stick in the entire structure heavier than 2 x 6, and yet the building is so rigid that scarcely a tremor could be felt in the frame work when we were putting on the roof lath in a wind storm that eventually made us climb down to keep from blowing away.

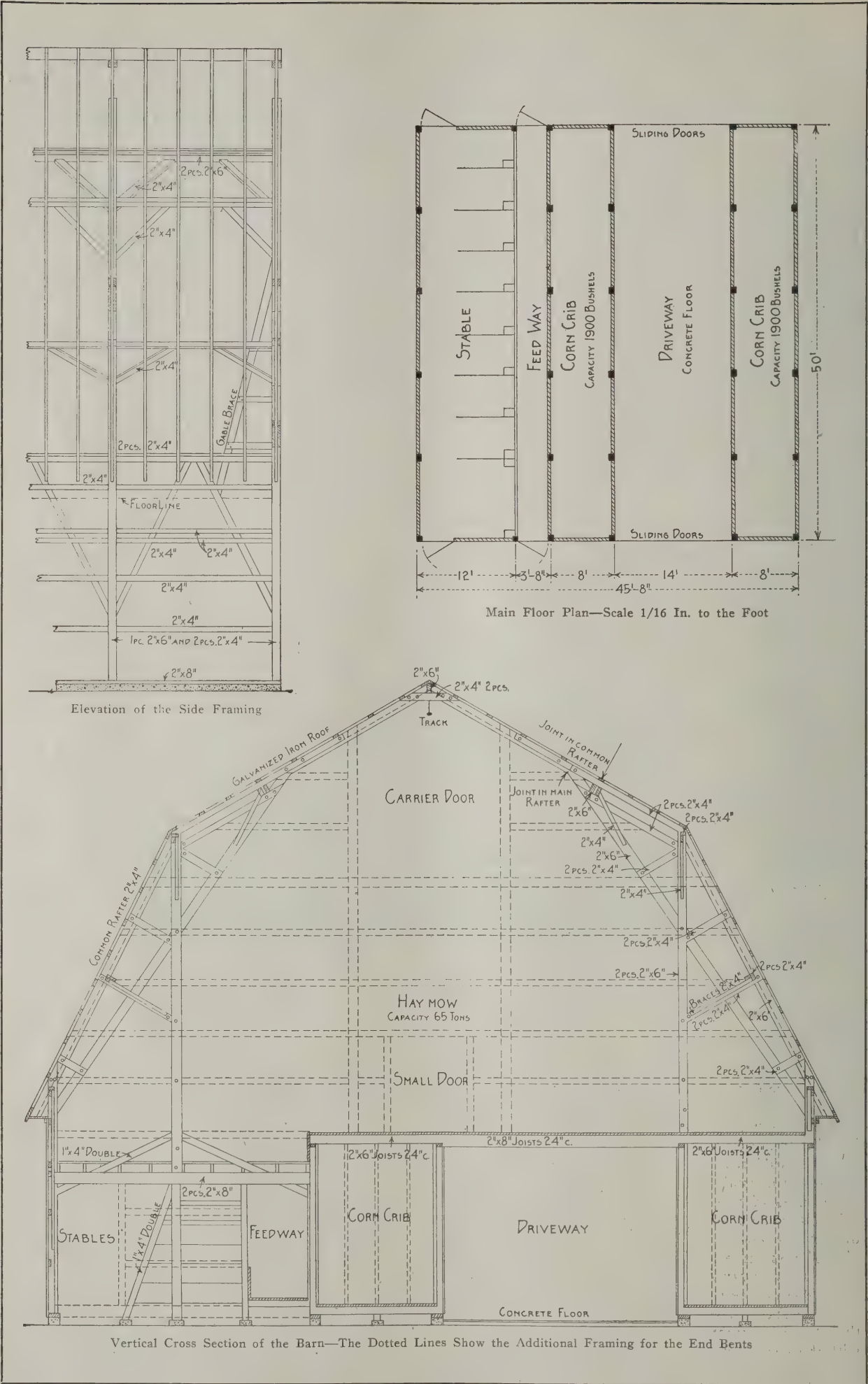


Economy in Farm Building Construction—General View of the Framing

The upper structure of this barn is framed on the principle of two large sheds facing each other, and so far as I know it is absolutely unique in design. It will be noted from an inspection of the cross section that the upper purlin plate is supported on the lighter end of a cantilever bridge truss, the center of which is carried by the post and the heavy end secured to the post at the eave. It will also be noted that this construction admits of roofing a very wide structure with comparatively short timbers.

One of the principal features of strength in this barn are the purlin braces from the first purlin to the center of the post. These braces coming from the purlin plate to the center of the post absolutely prevent any tendency of the post to buckle sideways, while the post is supported from the truss in such a way as to make it immovable in the center either way.

The capacity of the barn is approximately 4,000 bushels of corn, 65 tons of hay with stabling for 10 horses and shelter for tools in the driveway when not in use as a passageway for the teams.



Economy in Farm Building Construction—By L. H. Hand

I do not attempt to say that this is the strongest frame that can be constructed of this sized timber, but I do insist that it is the strongest frame I ever saw built of such material, and so far there has not been a single fault found with it by neighboring farmers. In fact, it is quite a neighborhood sensation and I hope the readers of *The Building Age* will go carefully into the merits of this frame and search out the weak points, if there are any.

The idea of framing two independent buildings facing each other, each building being self-supporting, and then roofing the space between is old, but the idea of resting a purlin plate on a trussed support extending out from these two independent structures is new so far as I know.

Another point in favor of a building of this kind is the ease with which it can be raised as the small bents are easily handled. A glance at the photographic view will show the scaffold used for putting up the upper ties of rafters. It is nothing more than a 21-ft. ladder made of 2 x 4-in. scantling, which was moved along the purlins as the work required.

I might add that there will be no windows in the stables. Each stall is to have a gate swinging in so that the outer doors can be thrown open in hot weather. Mr. White is another man who thinks renters do not attend to latching doors to keeping the wind from blowing them off their hinges, hence no manure doors. The manure is removed by carrier to a shed where the spreader stands and is dumped directly into it.

New York's Tall Buildings

A list of the tall buildings on Manhattan Island has been prepared by Superintendent R. P. Miller of the Bureau of Buildings of the Borough of Manhattan, and an inspection of the figures which follow is likely to prove interesting to many readers:

Stories.	Buildings.	Stories.	Buildings.
10	179	23	3
11	181	24	4
12	191	26	4
13	389	27	2
14	44	31	1
15	27	32	1
16	28	33	3
17	31	38	1
18	13	41	1
19	13	45	1
20	12	55	1
21	15		
22	11	Total	1,156

Basements also are included in the list where the floor of the first story is above grade and where there is an entrance into the basement from the street. Roof structures or penthouses when actually occupied for janitors' dwellings or some purpose other than for housing elevator machinery, stair exits, are considered as an additional story by the Building Department.

From this table it appears the average height of Manhattan skyscrapers (assuming anything 10 stories or more in height to be a skyscraper) is 13 stories.

Superintendent Miller estimates the total number of buildings in Manhattan at 120,000.

The Forestry Building at Vancouver, B. C.

The new building which is being erected at Hastings Park, Vancouver, is intended for the display of every known wood found in British Columbia. It will be known as the "Forestry Building" and the only materials used in its construction will be British Columbia fir. There will be 16 huge columns of fir extending across the main facade of the building and the space between on either side of the main entrance will be filled by old-fashioned cedar shakes. The interior of the structure will consist of a large hall, 80 x 190 ft., with a gallery running around all four sides.

The architects are Stuart & White of Vancouver, and the cost is estimated at \$22,000. As much British Columbia fir as possible will be used in the natural state. The building will suggest the type of architecture from which the Greek Doric style was originally developed when timber instead of stone was used.

A Southern Residence with Double Walls

We take pleasure in presenting herewith a general view of a rather unique residence located in one of the Southern states and having the double monolithic walls and most of the inside partitions built with a continuous air space extending from foundation to roof plate. The construction is literally one house built within another, but without the walls touching each other at any point. The continuous air space constitutes an insulation to such an extent that it is said no dampness or frost penetrates them, neither is there any condensation on the inner walls, although the plaster is applied directly to them without either



Southern Residence with Double Walls—Architect, Chas. G. Loring, Boston, Mass.

furring or lathing. The stucco finish was also applied directly on the outside walls.

The interior is largely of fireproof construction, the main partitions being of concrete, soundproof, hollow walls, and the floors of the first story are cement and tile. The greater portion of the wall surfaces are tinted plaster and the fireplaces are for the most part cement with colored tiles inserted. There is very little wood trimming except in connection with the built-in bookcases and window seats.

A house of this character is easily heated and in summer the dead air space between the walls tends to keep the rooms cool, while in winter they tend to retain the heat. The walls are firmly bound together with rods of steel and both walls are reinforced horizontally.

The double walls of the house as well as the walls of the large terrace shown in the foreground of the picture were constructed by the use of the Van Guilder hollow wall machines, made by the Van Guilder Hollow Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y.

The entire building and grounds have been laid out in Northern Italian style of country houses, the outer walls being of an old rose color, while the roof is of green Spanish tile. It is a substantial and interesting example of the method of construction indicated, and built in 1911 has given such satisfaction to the owner, Raphael W. Pumpelly, president of the Piedmont Plantation Company, at Samarcand, near Eagle Springs, N. C., that last year he erected a large sanitary dairy barn and silo by the Van Guilder method.

COLONIAL FRAME DWELLING FOR SMALL FAMILY

Elevations, Plans and Details of the House Represented by This Month's Colored Cover Design—Departure from the Box Type in Dwellings

A KITCHEN wing which practically isolates the culinary plant without the inconveniences of a detached structure is a feature of the two-story family dwelling which forms the subject of the cover design in colors this month. The house is well within the six thousand dollar mark, with ample accommodations for two adults and two children, with a maid's room in the wing. A large porch extending nearly the full depth of the building is easily accessible from the large living room on the first floor, and the wide hall which separates the latter from the well lighted dining-room gives an air of roominess to the first floor. The wing feature makes possible a convenient placing of the large linen closet, bathroom and clothes closets on the second floor, and relieves the designer from the necessity of cutting into bedroom space for these customary adjuncts of a well appointed home.

The front elevation shows a balanced design, with chimneys symmetrically placed at each side of the house, and the porch and wing showing beyond the main building facade. Considerable attention has been given to the doorway. The broad eaves project over the latter sufficiently to form an ample shelter. A colonial lamp hangs above the portal, and concrete vases are placed on either side.

Foundation walls are of stone, with concrete or stone footings not less than 10 in. thick and projecting at least 4 in. beyond walls on both sides.

The timbering is spruce or hemlock of the following sizes; sill, 4 x 6 in., laid flat; girders, 6 x 8 in., spruce; first floor beams, 3 x 10 in., long leaf Southern pine, placed 16 in. on centers; second floor beams, 3 x 10 in., long leaf Southern pine, 16 in. on centers; roof rafters, 2 x 8 in., 20 in. on centers; ridges 10 x 1 1/4 in. The house is of balloon frame, the outside vertical walls being covered with 7/8 x 8 in. matched sheathing, dressed on one side and over which is placed one thickness of black building paper.

Flooring is of maple, 7/8 x 2 1/2 in. tongued and grooved and blind nailed. The main cornice is formed with plain fascia and simple cornice mouldings and soffit. The shingles are laid in double courses, with weather surfaces of 1/2 in. and 9 1/2 in. alternately.

All outside walls, sides, and dormers are shingled with 18 in. random width Canada or Maine white cedar shingles, nailed with heavy galvanized iron nails.

The interior trim, base, etc., except the kitchen and pantries is of white pine or white wood.

The chimneys are built of field stone, with flues lined and all exposed surfaces have stucco finish. The chimney caps are of bluestone.

The mantels are of stone, with a neat, massive arch turned over the fireplaces, and surmounted by a large wooden shelf, with brackets.

Hung gutters and leaders are of galvanized iron, painted on both sides before setting. Step flashing is built in with the shingle courses against chimneys and dormers. All tin work is painted on both sides, before laying, with metallic paint.

The plumbing fixtures are of porcelain enameled iron, with nickeled fittings.

Combination gas and electric fixtures are used. The lamp over the main portal is finished in black iron. Drop pendants are used in the dining and living rooms—a 5-light drop for the living room and a 4-light drop for the dining room. Wall brackets are placed in the

bedrooms at various points to give proper light.

The walls of all rooms are lathed and plastered. Hemlock lathing is used and the lathed surfaces are covered with scratch and brown coat, making a hard, fine-grained surface. A hard white finish is given to the walls and ceiling of the kitchen, pantry, bath and lavatory.

Hexagonal, white tiling is used in the lavatory on the first floor and in the bathroom on the second floor. The tiling is bedded in cement, with tile base and cove.

Outside wood and metal surfaces, except shingles, have three coats of paint. Stain is used on wall and roof shingles. Three coats of paint are used on all inside standing woodwork, except in the pantry and closets.

The hardware is of Colonial pattern, in harmony with the general design of the structure.

The house is designed to cost about \$5,500. The detailed estimate follows:

Excavating	\$86.00
Grading	57.10
Masonry	1,320.00
Concrete and Cement.....	503.00
Plastering	295.00
Carpentry and Mill Work.....	1,871.00
Painting	200.00
Plumbing	350.00
Heating	295.00
Metal Work	110.00
Tile and Slate.....	170.00
Mantels	52.00
Gas and Electric Work.....	130.00
Hardware	50.00

Total Cost\$5,489.10

Figures are based on a cost unit of 19 cents per cubic foot, calculated from dimensions given:

House, porches, etc., 25 x 42 x 21 ft. h.....	22,050
Extension, 12 x 13 x 15 ft. h.....	2,340
Basement, 25 x 30 x 6 ft. deep.....	4,500

28,890

which at 19 cents per cubic foot equals \$5,489.10.

The house here shown was designed by Frank T. Fellner, architect, care of *The Building Age*, or 413 Caton Avenue, Brooklyn, N. Y.

Officers Wisconsin Master Carpenters' Association

At a recent meeting of the Wisconsin State Association of Master Carpenters, held at Milwaukee, officers for the ensuing year were elected as follows:

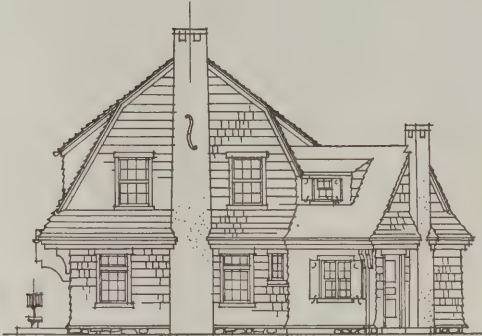
President.....	J. V. Frederickson, Madison.
First Vice-Pres.....	H. Wallschlaeger, Milwaukee
Second Vice-Pres....	P. J. Van Pool, Janesville
Treasurer.....	H. G. Zickert, Watertown
Secretary.....	O. H. Ulbrich, Milwaukee

It was decided to hold the next meeting January 9 and 10, 1914, in Janesville.

Frederic H. Betz, 1382 Clifton Boulevard, Cleveland, Ohio, has been appointed city architect by Service Director W. J. Springborn.



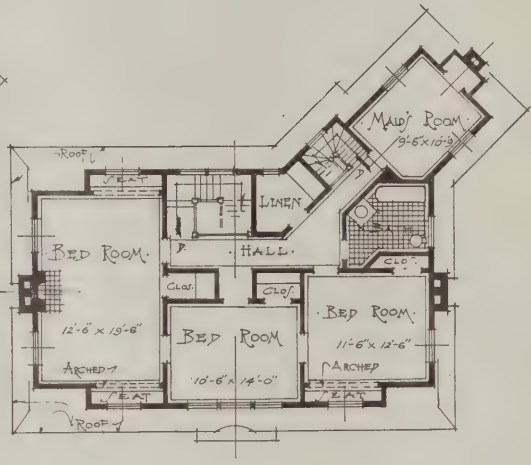
FRONT ELEVATION



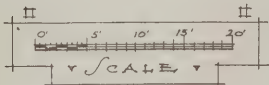
SIDE ELEVATION



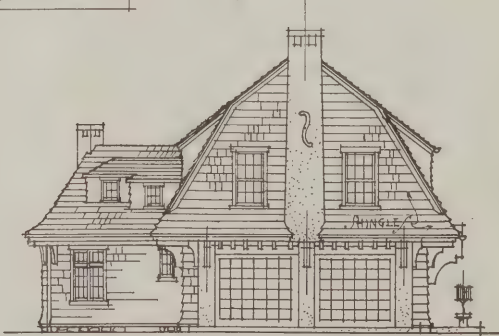
FIRST FLOOR PLAN



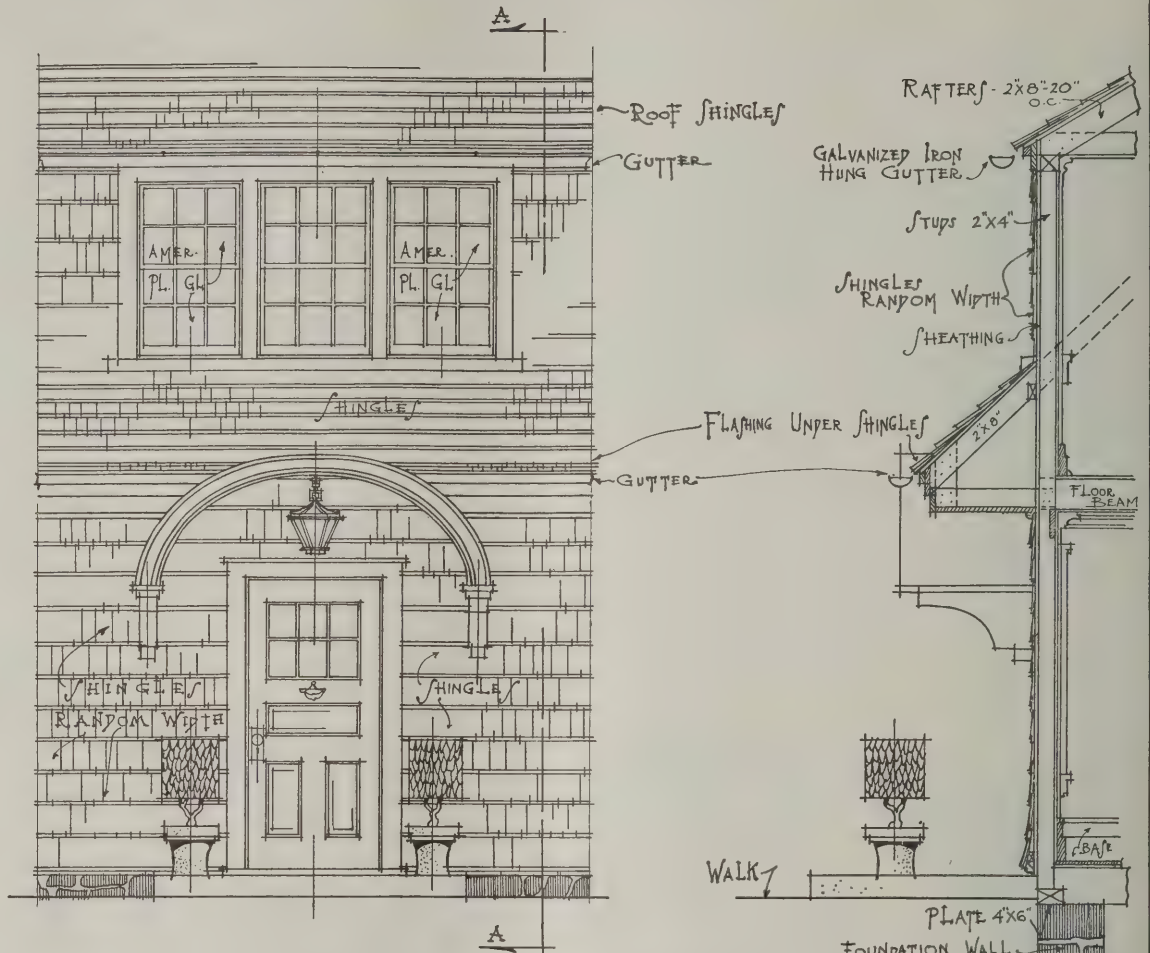
SECOND FLOOR PLAN



REAR ELEVATION



SIDE ELEVATION

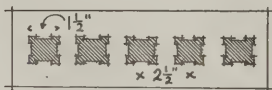


▽ ELEVATION AT FRONT ENTRANCE ▽

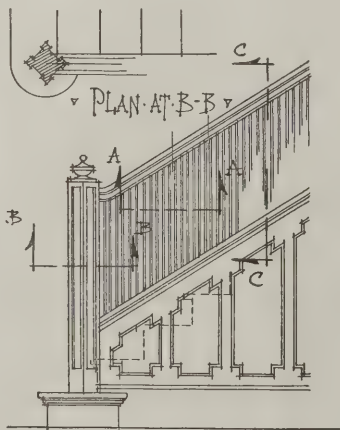
▽ SECTION A-A ▽

0' 1' 2' 3' 4' 5'

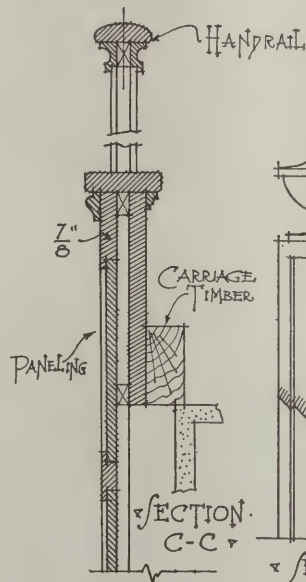
SCALE



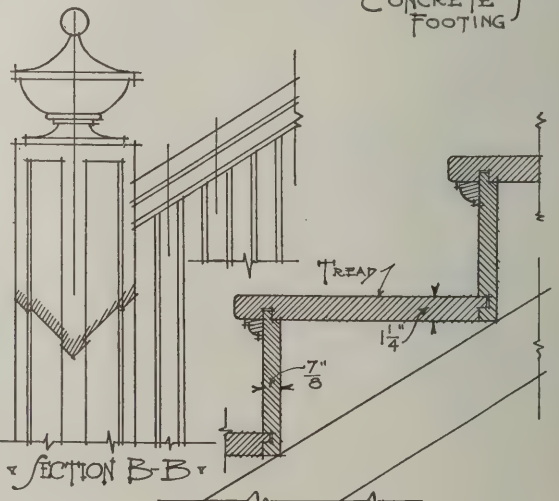
▽ PLAN AT A-A ▽



▽ PLAN AT B-B ▽



▽ SECTION C-C ▽



▽ SECTION B-B ▽

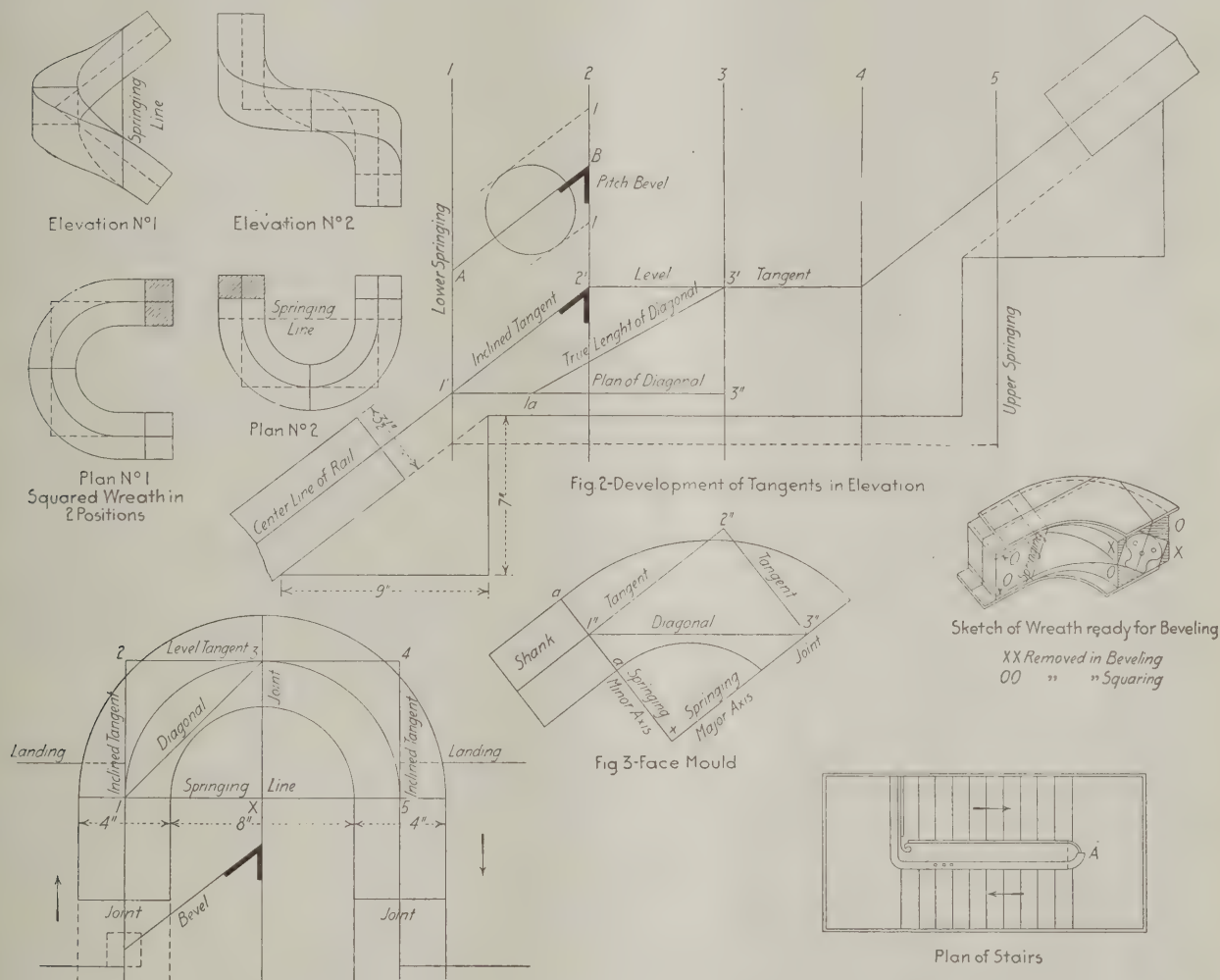
▽ DETAILS OF MAIN STAIRS ▽

THE EVOLUTION OF HANDRAILING

A Comparison of Various Systems of Laying Out the Work as Made by an English Writer

THE subject of stairbuilding is one of never ending interest to the builder, more especially the many problems which arise in connection with the art and science of handrailing, and in the comments which follow on the evolution of this phase of the work many of our readers will doubtless find much to hold their attention. The extracts are taken from a paper read by George Ellis before the Incorporated British Institute of Certified Carpenters at a meeting of that body in London and in addition to the various diagrams

the eighteenth century, and, as this relates to a veneer process, it may be reasonably inferred that when the art of joinery had reached this stage, a cruder method in this difficult branch would have preceded the veneer method; and deducing, from the generally accepted theory in analogous cases, that all early work in joinery was based upon, or adapted from, the stonemasons' methods, we may assume that the first handrails were built up in solid pieces in situ on a balustrade or solid screen to the stairs to which the handrail formed a



The Evolution of Handrailing—Plate 1—Handrail Diagram of a Half-Space Landing

presented in connection herewith models were used to illustrate the paper.

The earliest stairs constructed seem to have been spiral ones, winding around and between circular walls, usually chambers constructed apart from the building to contain them; few of these appear to have had handrails, ropes being the common aid to ascent. In the twelfth century, rectangular stairs were introduced, and the first of these were protected with iron balusters and handrails. An example still exists in the Cathedral of Sens, Province of Yonne, France.

The earliest attempts at forming a wooden handrail rising over a curved plan do not seem to have been recorded; or, at any rate, I have been unable to find any reference to such work earlier than the middle of

kind of coping, which was afterward worked to the desired shape. Such a rail and balustrade still exists, I believe, in the Château of Louis XII. at Blois, Loir-et-Cher, France, which is reputed to have been built in the fifteenth century.

When, however, the open balustrade was designed, constructed of a series of separate parts, this method would become too cumbrous, and it may well be surmised that the next step would be the building up of a "centre" or "cylinder" of the shape of the rail in plan to the surface of which the rail might be fitted. Whether the tentative fitting of solid pieces to this cylinder preceded the veneer process or followed it, I have been unable to determine; but of existing examples, the "veneer" rails appear the older.

The veneer process is first described by William and James Pain in the "British Palladio," 1793. Six lines are devoted to the process! which I will slightly amplify. A cylinder, similar to the one I have here, was made to the shape of the outside of the rail in plan, with sides perpendicular to the base—as you will observe, similar to the "drums" we use now-a-days for bending wreathed strings upon.

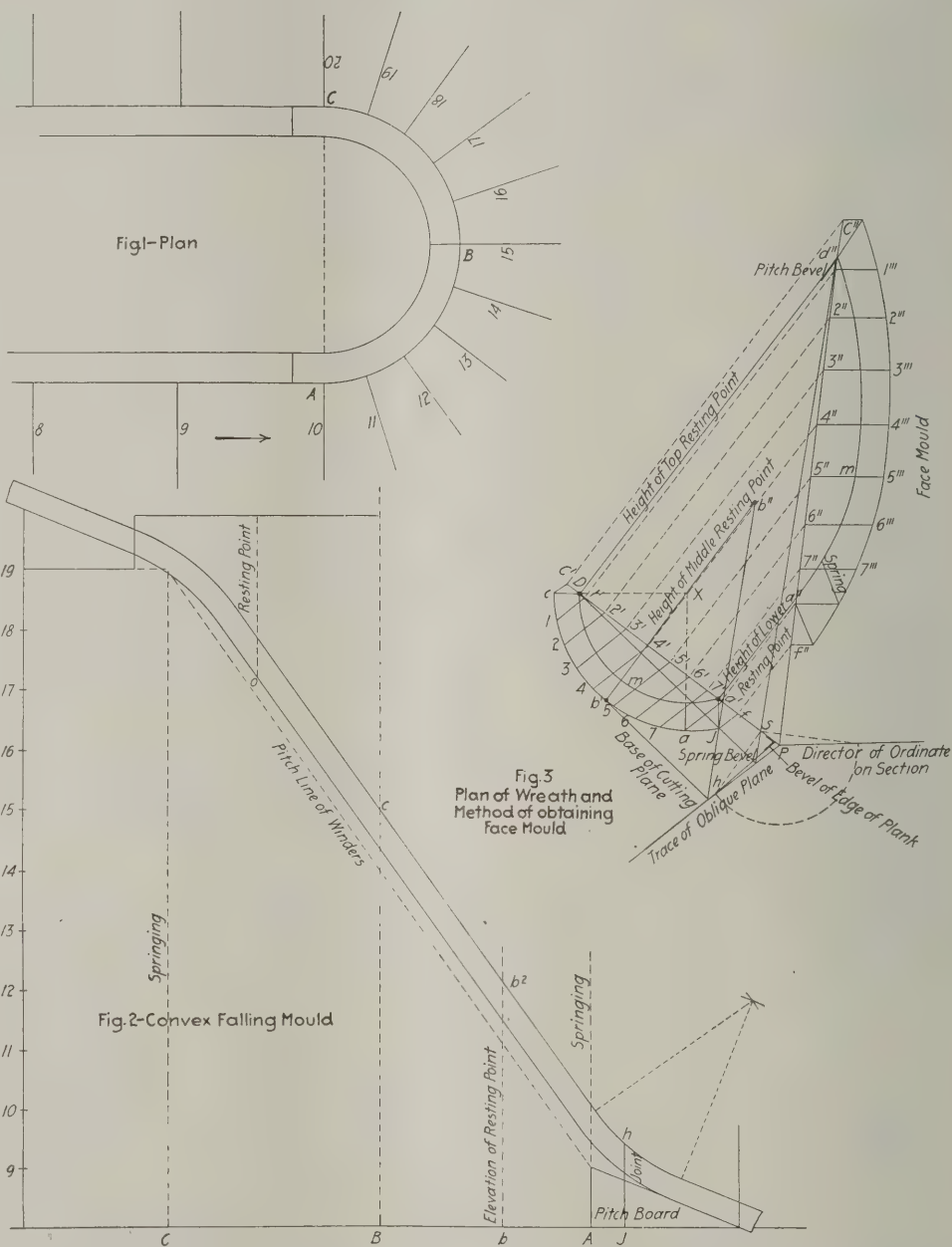
After setting out the steps upon the surface of the cylinder, a piece of wood, usually oak of straight grain, was selected and sawn into veneers, which were then, presumably, soaked in hot water—the authors are silent as to this—and bent around the cylinder on the nosings of the stairs, to which they were clamped after gluing together in their original order. When thus made up to the necessary width the wreath would be, as we now describe it, "bevelled" and "squared" ready for moulding. Given true helical curves, such as I show on this small model cylinder, this process would be easy and effective, but when awkward plans had to be dealt with, and the rail had to be eased out of a true falling line, the method offered difficulties that caused it to be abandoned, and we find that late in the eighteenth century wreaths cut out of the solid were again used, and these bear evidences of being fitted to a cylinder, that is, the sides have more perfect curves than the top and bottom edges.

About 1792 Peter Nicholson, a young cabinet maker, who had studied geometry to some purpose, read a paper at a meeting of the Society of Arts explaining a method he had devised for obtaining the shape of moulds for handrails by a geometrical process. That is, he discovered that a templet cut to the shape of the given section of a cylinder could be applied to the upper and lower surfaces of a plank, and the wreath piece cut out to the lines so marked would have accurate vertical surfaces without the necessity of fitting them to a cylinder. For this discovery he was awarded the society's gold medal, and the principles he adopted for forming face-moulds are still in use, though his methods have been much simplified.

In 1832 Nicholson published his "Carpenters' and Cabinet Makers' Assistant," in which he fully described the above process; which depended upon locat-

ing three arbitrary points in the air, or upon the surface of an imaginary cylinder. He was at this stage within an ace of discovering the principle of the later tangent system; but I suppose old habits tied him to the cylinder, and he was content to develop its surface into a plane and thereon to draw falling moulds fitting the profile of the stairs, and then, by a rather involved geometrical process, determine the required section of the cylinder by means of ordinates, and so obtain the facemould. Handrailleurs working by Nicholson's system produced the joints by means of the two moulds.

The falling moulds, of which there were usually



The Evolution of Handrailing—Plate 2—Showing Nicholson's 3-Point System with Beveled Ordinates; Also Wreath for Half Space of Ten Winders

two—one for the inside and one for the outside of the rail—giving the side or edge cut; and the facemould, the top or face cut, the edge of the plank requiring to be bevelled before the application of the moulds. The joints used were perpendicular to the plan and were then called splice joints, the parts being connected by ordinary "wood" screws. These joints, now only used in steep pitches over narrow wells, are now known as "bevel cut joints."

I have omitted to mention that previous to Nicholson's first book, the "British Carpenter," by Francis Price, appeared in 1733, giving very vague, but

grandiloquent, instructions for making wreathed handrails by a building-up process, that is, by gluing pieces on the sides of the straight rail, until it was sufficiently wide to cover the plan, then "easing it off to a graceful curve," as the author expresses it, by aid of moulds, which, however, he forgets to inform his readers how to obtain.

Peter Nicholson's work having shown that it was possible to demonstrate in a drawing exactly the shape of any desired rail, and thus placed the art, for the first time, upon a scientific basis, caused a great interest to be taken in this branch of joinery, and many writers

Mayer's method, but he chiefly attained his reputation by an energetic canvass of the country personally visiting workshops, and working a rail to an admiring audience, whom he afterward invited to subscribe to his book.

In 1870 the next great step in advance was made by G. Walton, who published his "New Guide to Handrailing" at Manchester, describing a method of producing facemoulds by means of tangents to the curves without the aid of ordinates. His book proved a comparative failure, partly through the imperfections of printing and engraving, which made his explanations

difficult to follow, but it gave the clue to the present simplified system, which I purpose explaining with some detail presently.

Since the aforementioned a host of writers have dealt with the subject, including your humble servant. I cannot claim to have added much that is new, but trust that I have somewhat simplified the methods already in use. There has been one other system recently introduced, under the title of the "Normal System," which, however, does not seem to possess any advantage over the square-cut system, save as a geometrical exercise, there being a redundancy of lines necessary to obtain the moulds, the method of using the moulds being a cross between the facemould and falling mould methods.

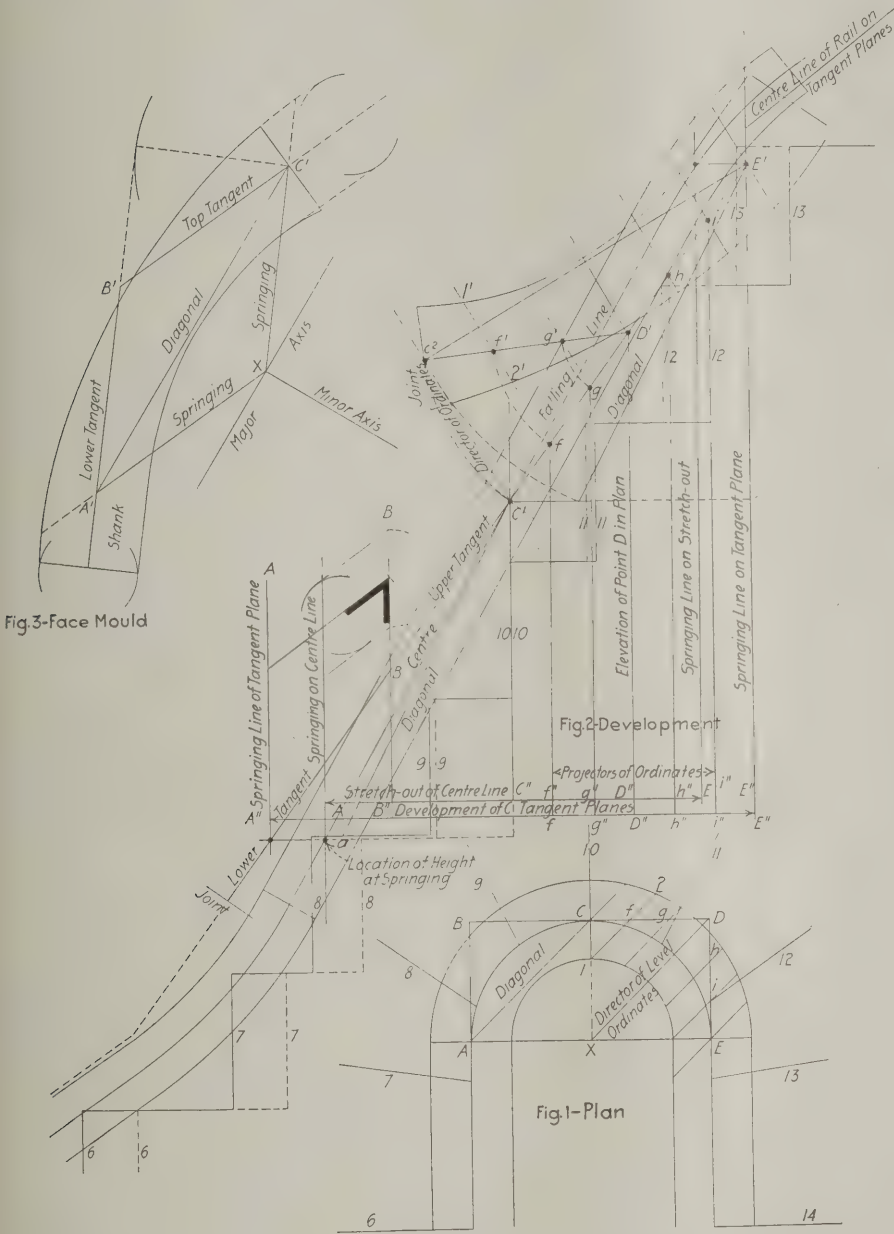
I now propose to illustrate, by aid of these models, how a facemould is produced by means of the "square-cut and tangent" system, of course taking an easy example, to avoid confusion of detail, merely premising that the principles hold good for any case, as you can see by inspecting the drawings shown on the walls. You are, probably, aware that the solid, termed a right cylinder, having straight or vertical sides and circular ends, when cut at any inclination from the horizontal, its section will be an ellipse, varying in shape according to the inclination of the section.

Now if that cylinder is made to fit one of the surfaces of the rail in plan, it is obvious

that any section of the cylinder will stand vertically over its plan, and form one of the edges or arrises of the rail, and all we have to determine is the inclination of the section required.

Now, resuming my main explanation, we require a given section of the cylinder to act as a templet or mould for marking the wreath piece, and as we make our drawings on flat surfaces, it is easier to deal with a plane surface than a curved one when marking lines on it, and this is the key to the tangent system.

Well, now let us draw it on paper. Here is a plan of a wreath over a landing (see plate 1), with lines



The Evolution of Handrailing—Plate 3—A Half Space of Winders; Face Moulds by Trammel and Ordinate-Method Compared

followed him, some improving, some confusing, his methods.

Among the former may be mentioned Joseph Banks; W. J. Easterbrook, who first described what is now known as the "square-cut" system, dispensing with falling moulds; David Mayer, who simplified Nicholson's bevelled ordinate method by using squared ordinates, drawn parallel to the horizontal trace of the oblique plane, or pitch of the plank.

Two American writers next came to the front, Charles Hill and Robert Riddell. Both of these used the ordinate system, the latter somewhat improving

drawn tangent to the central curve, 1, 2, 3, 4, 5, with a joint in the middle at 3, and steps and landing drawn in position. The lines represent the planes I have just shown you, and in this case the wreath will be inclined up to point 2, over the stairs, and level from 2 to 4 over the landing, and inclined in opposite direction from 4 to 5 over top flight.

Next develop the tangent planes, that is, turn them out flat, like your paper, and draw the steps as they intersect the planes in plan (see Fig. 2). On the nosings draw the rails and their centre lines, produce them to the elevations of points 2 and 4 and join them by the level line.

This gives us the tangents in elevation or "pitch of the plank," and a third line is required to obtain the shape of the section of the enclosing prism. This line, shown from 1 to 3 in plan, is called the "diagonal," and as it represents one edge of the section, it will run from 1 to 3 in elevation also. Draw a level line from point 1', Fig. 2, and on it, from point 3'', which is perpendicularly under point 3', the top end of the line lay off the length in plan, as point, 1a, join 1a3, and the true length of the diagonal is found. Next draw a triangle with the three lines shown on the development, the diagonal, and the two tangents, as 1'', 2'', 3'', Fig. 3, produce the inclined tangent line to required length for joint, and draw the joint square to it.

We have now the shape of the section of the enclosing prism, or tangent box, and as this plane contains also the section of the cylinder, we will draw that shape upon it. The shape of the cylinder section will be an ellipse, and as the easiest way to draw this figure is by trammelling, it is necessary to have the direction of the major and minor axes of the ellipse, so we draw two lines on the section plane, or facemould, parallel to the tangents at the springing points of the curve, which in this case will be the direction of the axes, the section plane being level in one direction.

At this stage I must point out that the imaginary cylinder we have been using is abandoned, and we now deal with two parallel cylinders, representing not the centre line, but the inside and outside faces of the rail, because, of course, this is what is wanted on the facemould. So mark off on the springing line, 1''—x, Fig. 3, points *a a* the width of the rail, as shown in the plan; this gives one point in each elliptic curve, and one other point is required, the width of the mould at the other end. To obtain this, place the length of the tangent 1'' 2'', Fig. 3, upon its developed plane, Fig. 2, as at A B. On this line set off the width of the rail in plan, producing the sides to intersect the perpendicular, 2, in points 1-1, which is the required width. Set this off on the facemould and trammel the curves from the two points completing the mould by drawing the sides of the shank parallel with the tangent line. This mould is used to line out the wreath piece, which is cut to the shape square through the plank. Then the tangent lines on the mould are transferred to both sides of the wreath piece, the center of the stuff marked on each joint.

I should have told you that the joints are to be made first, square to the tangent lines and to face of stuff, and the bevel, B, which is really a plumb line, representing the sides of the rail when at its proper inclination, is drawn through the center point, on the wide, or central, joint. This bevel line indicates on the top and bottom surfaces where the mould has to be placed ("slid" is the workshop expression), for lining out the edges of the wreath, so that when cut to them, the sides will be vertical, or would "fit the cylinder."

I now turn to ordinate systems, and on this drawing (plate 3) are shown, side by side, for the sake of comparison, wreaths for a half space of balanced winders, the moulds produced, one by the tangent system, with trammelled curves, and the other by an im-

proved ordinate system. Ordinate systems may be briefly described as the drawing of level lines; first on the plan of the rail, then upon the inclined plane, representing the face of the plank, which correspond, or lie directly over each other, then making the two sets of ordinates of corresponding lengths measuring, points in the curve, from some common plane to produce a facemould. It is in the selection of this measuring plane that the various ordinate methods differ. In Nicholson's method, which is shown on this drawing (see plate 2), he uses a plane touching the two salient angles of the rail in plan, as shown by line, D-a—P, Fig. 3. The plan ordinates, *c, 1, 2, 3, 4, 5, 6, 7, a*, are drawn parallel to the horizontal trace of a section of an irregular prism which is constructed to enclose the plans of three resting points on the imaginary cylinder. These points are indicated in plan, Fig. 3, by the dots, *a' b' D*, and in elevation by the circles, *a'' b'' d''*, the heights being obtained from the stretch-out of the outside rail in elevation, Fig. 2, and are arranged perpendicularly over their plans. Lines are drawn through these points to the ground plane, and a line joining their intersection with this plane gives the trace of the oblique plane.

The plan ordinates are projected from the plan of the sides of the prism, D-P, to the edge of the section. From the intersection, 1'', 2'', etc., other ordinates are drawn parallel to a director, found as follows: Take any point, S, in the line, D-P, and draw a perpendicular therefrom, intersecting the base of the oblique plane in point, *n*. From point, P, as center, and *p n* as radius describe an arc, which intersect by a perpendicular to the inclined edge of prism, *d''—P* drawn from S. Join the point of intersection to P. All that remains to be done is to make the correspondingly numbered ordinates of the same length, and trace the curves of the mould through the points so found. By this method, the edge of the plank requires bevelling to the spring bevel, shown in plan, before the pitch bevel can be drawn on the edge for the purpose of sliding the moulds.

I will now show you a much simpler method of obtaining moulds with ordinates (plate 3). Here the center line of the rail is enclosed with tangents, C-D-E, in plan. These planes are unfolded in Fig. 2 and the pitch of the tangents is shown as a straight line from E' to C' that being so, point D' is half the height of E above C, therefore a line drawn from D in plan, Fig. 1 to X, the opposite side of that square prism, must be a level line. Ordinates are drawn through the rail parallel to this line, cutting the sides of the prism in C', *f, g, D', h, i, E'*. These points are set off on the development, C', *f'', g'', D'', h'', i'', E''*, and perpendiculars projected to the line of section C' E'. Next the plan of section is unfolded on the edge, D' E'.

Obtain true length of diagonal, C' E', as described previously, with length as radius and E' as centre, describe an arc. With D' as centre and D' C' as radius describe another arc, intersecting the first in C². Join C² E', which places the diagonal in true position on the plane of section. Join C² D', which shows the edge of section in its new position, and join C' to C² and this is the director for the ordinates on the section, which are drawn through the points on the edge of the section, as shown.

Next make the ordinates on the section the same length that the similarly numbered ones are in the plan, measuring from the tangents or face of the prism, as *f' 1'* and *f' 2'* the same lengths as *f 1* and *f 2* in the plan and so on. Having completed the points, draw the edges of the facemould through them by means of a bent lath, or French curves.

Draw the joints square with the tangents, and mark the sides of the shank parallel with the same thus completing the mould.

REMODELING THE FRONT OF A BUSINESS BUILDING

A Piece of Work Involving Some Interesting Problems for the Building Contractor—Business Uninterrupted During Alterations

FOR some time past the sidewalks of certain streets in New York City have been in process of widening through the removal of all projections of buildings beyond the building line. In many instances this conforming with the municipal ordinance involved heavy expense and not infrequently the solution of interesting problems by the contractor doing the work. In the case of the six-story building facing on Thirty-second Street and occupying the block front from Broadway to Sixth Avenue, there were 12 granite columns two and four stories high in the street facades which with entrance stairs and other projections had to be removed. The lower portion of the building was occupied by a haberdashery and as the alterations involved considerable structural change it was decided to remodel the lower part of the front and to replace the massive masonry piers and walls there, by steel columns and girders which would give a considerably increased interior space.

The supporting of the massive old superstructure without injury during the removal of the sub-structure; the erection of the steel work, and the execution of other operations at the same time that business was being carried on in the stores and without interrupting the heavy traffic of the thoroughfares in question involved some very interesting points for the builder and contractor.

The basement, with a floor about $4\frac{1}{2}$ ft. below the sidewalk level, and the first story were occupied as stores, as noted above. The cellar, from 5 to 8 ft. high, was used for boilers, machinery, pipes, storage, etc. The walls to be removed extended around three sides of the building inside the vault walls, with concrete footings on the earth below the cellar bottom which were considered adequate for the foundation of the new steel columns. The walls were 3 ft. 8 in. and 4 ft. in thickness up to the second floor, and consisted of a marble front about 10 in. thick backed up with solid brickwork, all of which was to be removed up to the second floor.

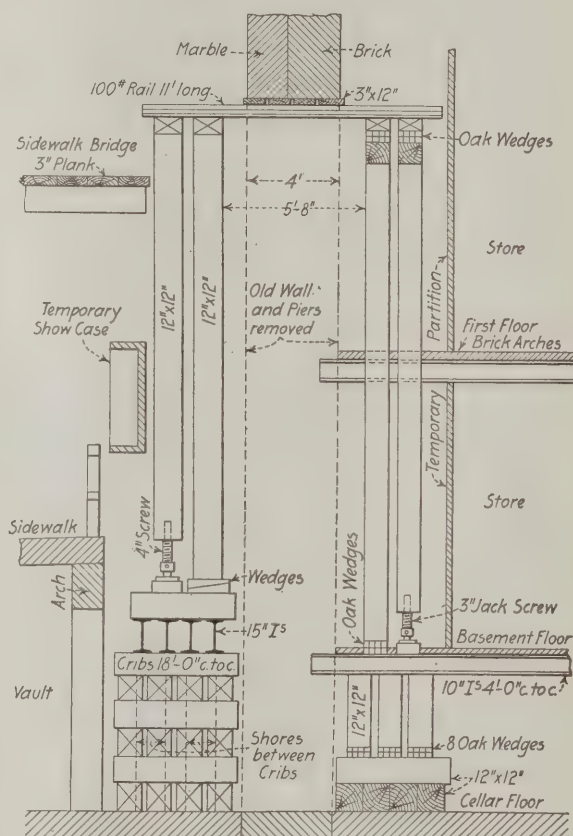
In order to disturb the stores as little as possible the work was divided into two nearly equal portions, successively executed so that in one-half of the stores no operations were begun until the other half had been completed and additional space provided. The work was started on about 60 lineal ft. of the wall on the Broadway face and one-half of the Thirty-second Street front, and the remainder of the Thirty-second Street front and the Sixth Avenue front were done in the same manner.

It was at first proposed to cut large holes through the masonry and insert in them long and deep I-beam needles, but as this would involve much cutting of valuable exterior cut-stone work the plan was changed and the wall was supported on very shallow needles which were compactly arranged and occupied a space of less than 5 ft. beyond the interior face of the wall. In the illustration presented herewith we show the way in which the shoring was managed.

A continuous grillage 4 ft. wide, of solid timbers laid parallel and close to the outer wall, was placed on the cellar floor and two and three-post bents of vertical shores were set on it and wedged up against the bottom flanges of the basement floorbeams, 4 ft. apart. Partitions of matched boards, covered on the outside with tar paper, were built parallel to the outer

wall and 5 ft. within it, to provide working galleries for the installation and operation of the needle-beams, show-cases were set on them, the counters were arranged to correspond, and the space between the partitions and walls was vacated for the shorers.

A strip of the basement floor was removed to expose the upper flanges of the floorbeams just above the cellar shores, and on them were laid two longitudinal lines of stringers receiving two-post bents of vertical shores, some of which supported the bottom flanges of the first floor beams and others adjacent to them passed through the first floor and supported caps parallel to the



Section of Wall with Details of the Shoring

walls which received the needles just below the second floor level. The second floor and the floors above it having wall bearings did not require independent shoring.

Timber cribs about 12 ft. long and 4 ft. wide and from 6 to 8 ft. apart in the clear were built close to the face of the wall in the open areaway between the front of the building and the sidewalk vault, and on them just below sidewalk level were carried four lines of I-beams with vertical shores seated on them opposite the wall piers.

A deck about 12 ft. wide, of 3-in. planks, supported on the usual transverse bents was built just below the second floor level to protect the sidewalk, to serve as a working platform and for the storage of materials. From it and from the inside scaffold, holes were cut through the wall and through the 6 x 4-ft. and 4 x 3-ft. 8-in. piers between the 4-ft. windows, and in each hole a set of 100-lb. steel rails 11 ft. long, with a clear span

of 5 ft. 8 in. was supported on the shores. The rails were arranged in double tiers with alternate rails reversed so as to pack closely together, thus occupying spaces only about 6 in. high and from 16 to 24 in. wide.

Cushions of 3 x 12-in. planks were wedged tightly between the upper surfaces of the rails and the masonry, and special care was taken to support the marble face stones so that they should not be displaced or their bond broken. The heaviest pier, with an estimated load of 275 tons, was carried on ten rails which deflected less than $\frac{3}{4}$ in. One of the shores under each end of each group of rails was provided with a 3-in. steel jack screw and the other was set on several oak wedges. The jack screws were simultaneously operated to raise the wall about $\frac{1}{16}$ in. as regularly and accurately as possible, and as soon as this demonstrated that the full load was positively transferred to the needles the wedges were adjusted under the other shore to follow up the other jack and provide positive bearing independent of the jack.

All of the masonry between the needle-beams and the old footings was removed by the shoring contractor who loaded the debris into 1-yd. steel buckets in the areaway and hoisted them by a stiff-leg derrick through a trap in the sidewalk bridge and stored them on the latter until it was convenient to deliver them to trucks in the street. After the removal of the old masonry a set of temporary show-cases was installed in front of the building adjacent to the sidewalk so that the store's display could be maintained while the new front was being built. The first section of wall was shored and the new steel work erected without any settlement or injury to the building or without serious interruptions to business.

Dry Rot in Construction Timber

The results of some experiments and observations on the destruction of lumber in buildings are set forth in a short paper entitled "Dry Rot in Timber Used in Slow-Burning Construction," read before the Boston Section of the American Society of Mechanical Engineers by Frederick J. Hoxie, Phenix, R. I., and from it we make the following extracts:

The author arranged an experiment to determine whether the rosin in long-leaved pine heart wood was an important factor in resistance to fungus. A cubic block of dense fine-grained wood 2 in. on a side, containing 18 per cent. rosin, was sawed in two across the grain, and half of it was boiled in benzole until practically all the rosin was removed. The solvent was driven off, and a piece of wood containing living dry rot fungus was placed between the two blocks. The whole was placed in a moist atmosphere and the fungus allowed to grow for a year, at the end of which time a dense white growth had formed over each block. This growth was removed, the blocks dried and weighed. The specimen from which the rosin was removed had lost 8 per cent., the other only 2 per cent. Neither showed the brown color characteristic of rotten wood until after they had been dried for some time.

Destruction of Dry Rot

Mr. Hoxie stated that dry rot fungus, though not as common as several other varieties, has a thermal death point less than 100 deg. F., so that the practical application in the case of these fungi is that they may be destroyed in many cases by use of the building heating system. A badly infected mill can be given a cure or one can get good results if the heating is applied soon enough, but he mentioned that the cure is not likely to affect the growth of fungi in the ends of beams in the brick wall where the heat does not readily penetrate.

His suggestion is that when there is any question as to the quality of the stock used in the building heat is worth trying and should be done as soon as possible after the building is completed.

Several of the more common fungi which destroy basement floors, fence posts and railway ties are capable of resisting temperature up to the boiling point of water. It appears also that these fungi have strands sometimes several feet long, capable of traveling for some distance across masonry or metal from beam to beam. Diseases of timber, he suggested, like diseases of men, have excited more interest in cure than in prevention. Prevention is by far the best procedure, he added, and much work has been done along this line on railroad ties, telegraph poles, etc. In conclusion Mr. Hoxie said, in part:

Rot Preventive Measures

Numerous antiseptic compounds have been suggested, creosote compounds and chloride of zinc being probably more commonly used than any others. Creosote, however, is objectionable in buildings owing to its black, greasy nature, its somewhat increased fire hazard and disagreeable smell. The kyanizing process of treating timber with corrosive sublimate solution has been used more or less frequently with good results. Although its cost, corrosive qualities and poisonous nature have probably operated to prevent its more general use, it appears to be well adapted to treatment of factory lumber. Chloride of lime appears to encourage the disease rather than remedy it.

The season for cutting timber seems to have only a secondary importance, but the dryness of the wood, whether the moisture be sap or rain water, is an important factor. Preserving timber under water prevents fungus growth while the material is in storage, as fungus cannot grow without an air supply. It may also have some benefit in dissolving from the outer parts of the wood where infection must start some of the nitrogenous constituents which serve as food for fungi. Further investigation is however needed along the line of the chemistry of seasoning and heart foundation.

Quick-growing timbers will continue to come into more general use owing to their more rapid reproduction. The author's experiments would indicate that hard pine, to be able reasonably to resist fungus in building construction, without antiseptic treatment, should contain about 10 per cent. of rosin. Artificial saturation of wood with rosin has been tried without very satisfactory results, owing to the lack of penetration. It should not absorb over 5 lb. of water per cubic foot in 24 hours at 70 deg. F. from kiln dry conditions, and should weigh not less than 38 lb. per cubic foot kiln dry. These characteristics generally accompany fine-grained material, and with them fine-grained material is better than coarse grained, while without them the fine grain does not appear to be a saving quality.

Death of Frederick W. Devoe

Frederick William Devoe, the well-known paint and varnish manufacturer, died at his home, No. 59 Park Avenue, New York City, on March 21, in the 85th year of his age, he having been born in the city named on January 26, 1828.

From 1852 to 1864 he was a partner in the firm then known as Raynolds & Devoe. From 1864 to 1890 the business was done under the style and title of F. W. Devoe & Co., but since that year Mr. Devoe had been president of the combined firms known as the F. W. Devoe & C. H. Raynolds Company, with offices at 101 Fulton Street.

CABINET WORK FOR THE CARPENTER—IV.

Furnishings for the Porch and the Grounds—Less Discarded Furniture Used Out of Doors—Certain Appropriate Patterns

By PAUL D. OTTER



fixed, of which this article will treat.

While the American people pursue their business with great intensity, there is much evidence in every direction of real interest in the study of comfort and bodily relaxation in out-door life. The marked reformation in park management, the working together of landscape gardener and architect in providing attractive and suitable benches and settees of a durable and attractive character, has influenced greatly the makers of portable summer furniture, as well as creating a desire for other forms which are more massive and fixed, of which this article will treat.

The benefits of out-door life can be enjoyed much later in the fall and even during some rare mild sunny days in the winter, if a sheltered nook or angle is taken advantage of for a permanent seat or settle. I think this is one of the features left out of the modern home and its surroundings—a feature which gave such a rare charm to the Colonial place, with its door stoop, settles, or the seat under the grape arbors. The writer was inspired to amplify on a primitive form of bench which he saw in old Germantown, Philadelphia. The original stood weather beaten, yet inviting, out on the open lawn nearby a box hedging. It consisted of two wide end planks and cleats placed V-shaped on the inside above the seat, so as to allow the loose bolted stanchion supporting the back to be swung either way. This feature was attractive as it allowed one to enjoy the view in two directions.

In Fig. 1 is shown the improvement on this simple idea, by having the back rack *A* of Figs. 2 and 3 hang loosely on a lag screw at *E* of Fig. 3 at top of the swinging stanchion *B*, Fig. 4, the bottom being controlled to a more comfortable back inclination by a loose fitting steel strap *C*, of Fig. 4, which has a screw head slot which slips over a round head screw in the lower part of the stanchion, as shown. Such an adjustable back does not require the seat to be wider than 15 in. The seat consists of a $1\frac{3}{4}$ in. thick plank with a number of $\frac{3}{4}$ in. holes bored to drain off the rain, and the 3 in. wide front aprons stand off the width of $\frac{1}{2}$ in. cleats, leaving several long slits for snow and moisture to pass off. The bench was given four coats of white lead and provided with four well painted $1\frac{3}{4}$ in. square pointed pickets, carefully driven in deeply into the ground, so that they lined up true with the front and back edges of the plank ends of the bench, which also were $1\frac{3}{4}$ in. thick. A hole was

properly bored through each picket and a smaller hole into the bench end to receive a 5 in. lag screw drawn up tightly against the washers.

When it is desired to change the position of the back to the opposite direction the two iron catches *C* are disengaged from the slot and drawn over round head screw, when the entire back, together with the swinging stanchion *B*, may be swung over until it rests on the opposite back support block *D*, shown in dotted line on Fig. 2. These blocks are $1\frac{3}{8}$ in. square, and have the same bevel as the inclination of stanchion *B*. They are, of course, the important part of the construction, and are secured firmly by two countersunk screws in each block. A quarter round should be given the edges of these blocks, as well as to the edges of the seat on both sides, the arms and to the edges of the stanchions, so that they will not be unpleasant to the touch after being painted. To safeguard splitting from exposure, a piece of No. 18 sheet brass was fitted over the rounded ends of *B* and secured by small screws. A thin carriage bolt was also run clear through on the inner side of the loose bolt holes. This prevented any possibility of splitting. The stanchion was made of maple 1 in. thick. The back boards of the back *A*, shown in Fig. 3, are $1\frac{1}{4}$ in. thick and are secured by long countersunk screws to hard wood end strips $1 \times 1\frac{1}{2} \times 12\frac{1}{2}$ in. Through this and into the top panel a lag screw at *E* enters from *B* and is drawn up against intervening washers just tight enough to allow the back panel frame to operate easily. A cross cleat



Fig. 1—General View of a Garden Bench Having a Reversible Back

and heavy wood brace, as shown under the seat, give the bench added strength.

As to the length of the bench, it may properly be 42 or 48 in. Pine is a suitable wood or well selected cypress with oak arms.

The garden seat which has been in use in England many centuries is shown in Fig. 5. There is nothing trifling about it as it is made of heavy parts and so constructed as to throw off water. When kept painted it presents a dignified and restful appearance along the garden walk, or placed in some particularly attractive place against a hedge on the lawn. Many modifications can be made from the general measurements given, as shown on the end view drawing, Fig. 6. Four horizontal bars may take the place of the splat back filling, as shown in Fig. 5, or two panels of criss-cross bars may occupy the back. A varied top line to the top slat may suggest itself as indicated in the bottom edge of the front seat rail. Some old English settees had a bunker space immediately under a hinged seat, where a croquet set would be at hand if wanted. This could very well take up the space down to cross strainers on

the ends. Well selected timber should be used, cypress being good wood for the front and back posts, as it withstands rotting better than most woods.

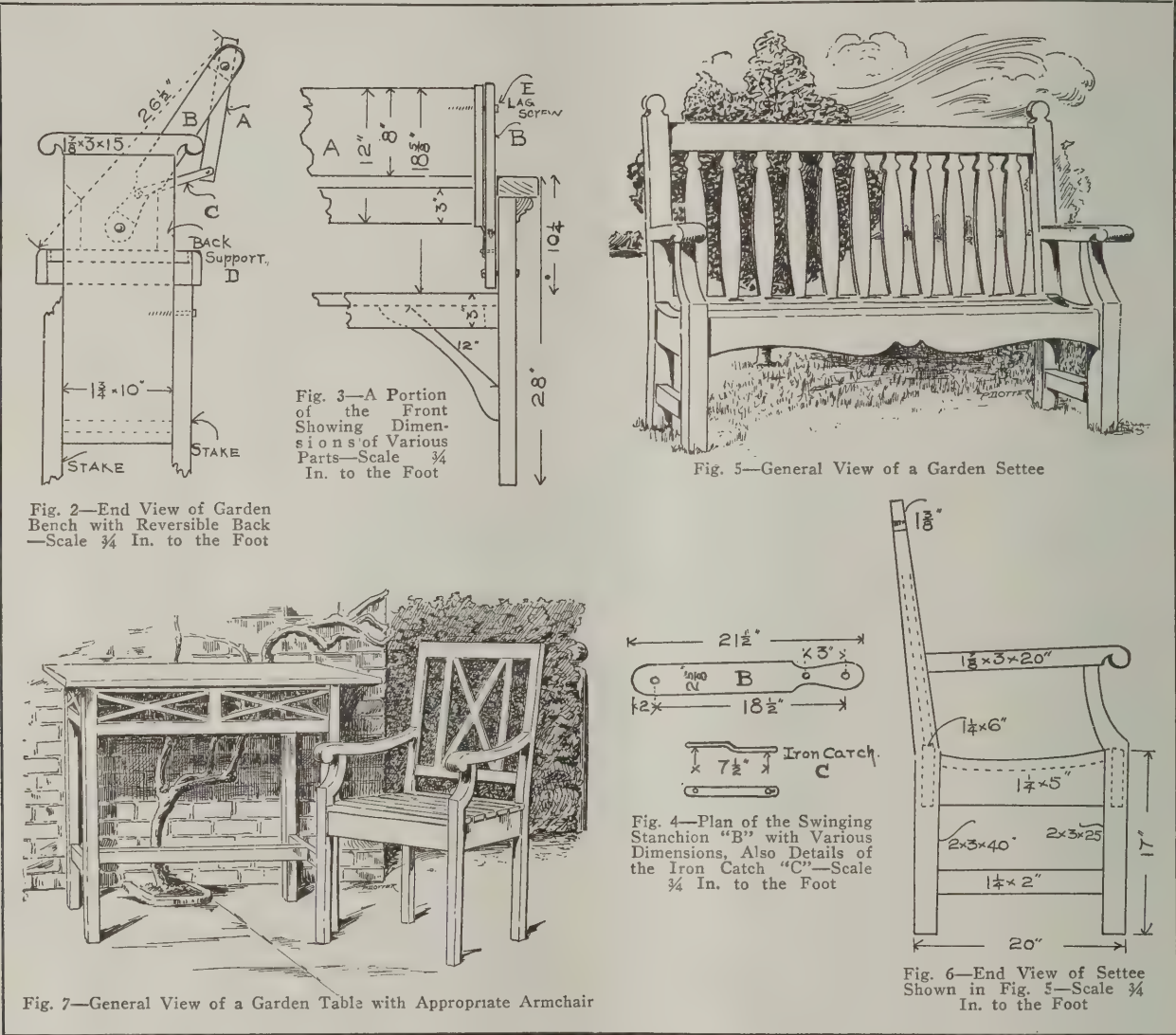
If it is possible the back posts should be secured from a pattern drawn within a surface of 3 x 5 x 40 in. and the front post within a surface of 3 x 4 x 25 in., drawing and cutting out patterns to shapes shown. They can then be marked out on a plank 3 in. thick with a reasonable reference to position of grain.

The seat consists of slats 1 1/4 x 2 1/4 in., kept apart about 1/4 of an inch, the latter being secured by countersunk screws to the seat cleats, taking the shape of end rails, as shown. The splats shown in back should be 7/8 in. thick and 2 1/4 in. wide, mortised with a heavy tenon to the top slat and back seat rail. All tenons

into much detail except to say that the table would look well 30 in. high and with a top 25 x 36 in. and posts 2 in. square.

The chair should measure 20 in. between front posts and 18 in. between back posts, both set parallel. The back is to be 22 in. high from top of seat. The seat is 19 in. deep and to stand 18 in. at front edge from floor. Cut off the back posts 3/4 in. at floor when finished, to give the proper pitch. The arms are 9 1/2 in. high at front and sawed out as shown from stock 2 1/4 in. wide. The front and back posts are sawed out of 2 in. stock. The seat slats are 7/8 in. thick by about 2 in. wide, parted by 1/4 in. Corner blocks should go against the 4 in. seat rails underneath the seat.

It is frequently desirable to have a settee which



Cabinet Work for the Carpenter—IV.

should be long, or go clear through posts, set in white lead and secured by dowel pins. Heavy corner blocks should be placed at each corner under the seat. Before painting several coats of white lead it might be well to have posts stand in a pan of creosote or tar.

Time was, not long ago, when the worn out old sitting room chair relegated to the attic was dusted off every spring to do crippled service on the porch during the summer. As much of such furniture depended originally on the honesty and integrity of glue under sheltered conditions, they often prove unequal to many summer showers or even the dews. Fig. 7 shows two simple forms of easily constructed out-door pieces, intended to be bolted and treated to spar varnish, or, better still, made in pine or cypress with good fitting tenons and heavily painted. It is unnecessary to go

possesses a feature such as the criss-cross in table and chair of Fig. 7. Such a settee with a total length of 48 or 60 inches may readily be planned, having three or more cross panels similar to the arm chair shown.

For the second year in succession the University of Pennsylvania School of Architecture has carried off the principal prizes in the Intercollegiate Architectural Competition, which comprises a number of institutions in the eastern section of the country and Canada. William J. H. Hough of Ambler won the prize in Class I, and W. B. Rabenold of Reading, Pa., won the honors in Class II. In Class I the problem was an addition to the Metropolitan Museum, and in Class II a university library upon Gothic and classical lines.

SIX MONTHS ADVANCE IN LUMBER PRICES

Scope of Changes in Various Kinds of Lumber in the New York Market Since October, 1912—Tendency Still Upward



DURING the last six months builders in and about New York City have complained of the increased cost of construction and have attributed this very largely to the heavy upward fluctuations in lumber. Wholesale dealers have ascribed the advance to the increased demand and the decrease in supply indirectly aided by higher transportation costs and scarcity of labor. It is entirely probable they say that even the April list will move up before the month closes. The issue of the *Record and Guide* for April 5 contains the following compilation which shows at a glance just how much each grade of lumber has advanced in price, the first column of figures representing the current official Association list and the last column that for October, 1912:

ASH, WHITE.

5/4 in. 6/4 in. 1st and 2ds, advanced.....	\$4.00@	\$3.00
8/4 1st and 2ds, advanced.....	4.00@	3.00
2½ and 3 in. 1st and 2ds, advanced.....	5.00@	5.00
4/4 in. clear strips, advanced.....	3.00@	2.00
4/4 in. No. 1 common, advanced.....	3.00@	2.00
2½, 3 and 4 in. No. 2 common, advanced.....	3.00@	5.00
4/4 in. No. 2 common, advanced.....	3.00@	3.00
5/4, 6/4 and 8/4 in. No. 2 common, advanced.....	3.00@	2.00

BASSWOOD.

4/4 in. 1st and 2ds, advanced.....	\$1.00@	\$1.00
4/4 in. No. 1 common, advanced.....	—@	1.00
5/4, 6/4 and 8/4 No. 1 common, advanced.....	—@	1.00

BIRCH.

4/4 in. 1st/ and 2ds, advanced.....	\$2.00@	\$3.00
4/4 in. 1st and 2ds, saps, advanced.....	1.00@	3.00
5/4, 6/4 and 8/4 in. 1st and 2ds, reds, advanced.....	3.00@	2.00
5/4, 6/4 and 8/4 in. 1st and 2ds, saps, advanced.....	1.00@	2.00
2½, 3 and 4 in. 1st and 2ds, unselected color.....	5.00@	5.00
4/4 in. No. 1 common, red.....	2.00@	—
4/4 in. No. 1 common, sap.....	1.00@	1.00
5/4, 6/4 and 8/4 No. 1 common, red.....	2.00@	2.00
4/4 in. No. 2 common, unselected color.....	2.00@	2.00
5/4, 6/4 and 8/4 No. 2 common, unselected color.....	2.00@	2.00

CHERRY.

4¼ in. 1st and 2ds.....	—@	\$5.00
5¼, 6/4 and 8/4 in. 1st and 2ds.....	—@	5.00
2½ and 3 in. 1st and 2ds.....	—@	5.00
4 in. 1st and 2ds.....	—@	5.00
4/4 in. clear strips.....	—@	3.00
4/4 in. No. 1 common.....	—@	2.00
4/4 in. No. 2 common.....	—@	1.00
5/4, 6/4 and 8/4 in. No. 2 common.....	2.00@	2.00

CHESTNUT.

4/4 1st and 2ds.....	\$1.00@	\$1.00
5/4, 6/4 and 8/4 1st and 2ds.....	1.00@	1.00
4/4 No. 1 common.....	1.00@	1.00
4/4 wormy and No. 2 common.....	2.00@	—
5/4, 6/4 and 8/4.....	3.00@	3.00

CYPRESS SHINGLES.

F. O. B. New York by Car.

6x18 No. 1 heart cypress shingles, per M.....	\$1.00@	\$1.00
6x18 No. 1 primes or A's, per M.....	1.75@	1.75

CYPRESS.

F. O. B. New York Market.
Lumber, Rough or Dressed.

Firsts and seconds, 1 inch.....	—@	\$2.00
Firsts and seconds, 1¼ inches.....	\$0.50@	3.00
Firsts and seconds, 1½ inches.....	2.00@	3.00
Firsts and seconds, 2 inches.....	1.00@	3.50
Firsts and seconds, 2½ inches.....	2.00@	3.00
Firsts and seconds, 3 inches.....	1.00@	2.00
Selects, 1 inch.....	1.00@	3.00
Selects, 1¼ inches.....	1.00@	2.00
Selects, 1½ inches.....	2.00@	4.00
Selects, 2 inches.....	1.00@	3.00
Selects, 2½ inches.....	1.00@	3.00
Selects, 3 inches.....	1.50@	3.50
Shop, 1 inch.....	1.50@	3.00
Shop, 1¼ inches.....	2.50@	4.00
Shop, 1½ inches.....	1.00@	2.50
Shop, 2 inches.....	—@	1.50
Shop, 2½ inches.....	—@	2.50

DOUGLAS FIR.

8/4 to 16/4 No. 2, clear and better.....	\$1.00@	\$1.00
Yard sizes, 8/4 to 16/4x6-8-10-12x12/28.....	1.00@	2.00
12x12x20/40.....	2.00@	3.00

RAIL DELIVERY.

1x3 Rift flooring, No. 1.....	\$5.00@	\$3.00
1x3 Rift flooring, No. 2.....	8.00@	6.00
1x4x6 Rift flooring, No. 1.....	2.00@	1.50
1x4x6 Rift flooring, No. 2.....	4.00@	4.00

FLOORING.

13-16 Oak, 2, 2¼ and 2½.

Clear, quartered, white oak flooring.....	\$1.50
Select, quartered, sawed white oak flooring.....	5.00
Clear, quartered, red oak flooring.....	1.50
Select, quartered, sawed, red oak flooring.....	5.00
Clear, plain sawed, white oak flooring.....	2.00
Select, P. S., white oak flooring.....	3.00
Clear, plain sawed red oak flooring.....	2.00
Select, P. S., red oak flooring.....	5.00

MAPLE FLOORING.

F. O. B. New York City.

Grade.	Face.	Face.	Face.	Face.
13/16x2 in. 13/16x2½ in. 13/16x3¼ in. ¾x1½x2 in.				
Clear.....	\$3.50	\$4.50	\$3.00	\$3.50
No. 1.....	3.00	3.00	4.00	—
Factory.....	3.00	3.00	2.00	—

LONG LEAF YELLOW PINE FLOORING.

A, heart rift, 13/16x2½ face, counted 1x3, D. M.....	\$0.50
B, heart rift, 13/16x2½ face, counted 1x3, D. M.....	2.00
A, sap rift, 13/16x2½ face, counted 1x3, D. & M.....	2.00
B, sap rift, 13/16x2½ face, counted 1x3, D. & M.....	4.00
A, flat rift, 13/16x2½ face, counted 1x3, D. & M.....	1.50
B, flat rift, 13/16x2½ face, counted 1x3, D. & M.....	2.00
No. 1 com. flat rift, 13/16x2½ face, counted 1x3, D. & M.....	2.00

GUM (RED).

F. O. B. N. Y., Lighterage Free.

1 in. No. 1 common.....	\$0.50@	\$1.50
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SAP GUM.

F. O. B. New York.

1 in. 1st and 2ds.....	\$0.50
1 in. No. 1 common.....	2.00

HEMLOCK.

F. O. B. New York.

Pennsylvania hemlock, base price.....	—@	\$1.50
W. Virginia hemlock, base price.....	\$2.50@	2.00

LATH.

Eastern Spruce, F. O. B. New York.

1½ in. slab lath.....	\$0.65@	\$0.65
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MAHOGANY AND CEDAR LOGS.

Mexican Mahogany.

Cazones, Tecolutia.....	\$1.00@	\$1.00
Frontera.....	.50@	1.00
Tlacoatalpan.....	1.00@	.50
Tlacoatalpan (white).....	—@	1.00

MAPLE, HARD AND SOFT.

4/4 in 1st and 2ds.....	\$1.00@	\$2.00
5/4 and 6/4 in. 1st and 2ds.....	2.00@	3.00
8/4 in. 1st and 2ds.....	2.00@	3.00
4/4 in. clear strips.....	5.00@	7.00
5/4 in. No. 1, common.....	4.00@	4.00
6/4 and 8/4 in. No. 1, common.....	4.00@	4.00
4/4 in. No. 2, common.....	2.00@	2.00
5/4, 6/4 and 8/4 in. No. 2, common.....	2.00@	2.00

COUNTERS.

I in clear strips, 2½ in. to 5½ in. wide, 5 feet and over long, \$5 per M. foot (gain).	
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OAK, QUARTERED WHITE.

Indiana 1st and 2ds, 6 inches up wide, 10 to 16 feet long, about 25 per cent, 10-foot lengths.....	\$2.00@	\$2.00
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SPRUCE.

Adirondack—12 and 13 Foot—Canada.

F. O. B. New York, Rail Rate Delivery.

1x4 in.....	\$2.50@	\$3.50
1x5 in.....	2.00@	2.00
1x6 in.....	3.50@	3.50
1x7 in.....	2.50@	2.50
1x8 in.....	3.00@	3.00
1x9 in.....	4.00@	4.00
1x10 in.....	4.00@	5.00
5/4x2½ in.....	1.75@	1.75
5/4x3 in.....	3.25@	3.25
5/4x4 in.....	2.25@	2.25
5/4x5 in.....	1.50@	1.50
5/4x6 in.....	1.75@	2.25
5/4x7 in.....	2.00@	2.00
5/4x8 in.....	1.50@	2.00
5/4x9 in.....	2.00@	2.50
5/4x10 in.....	6.00@	6.50
2x2½ in.....	1.50@	1.50
2x3 in.....	3.50@	3.50
2x4 in.....	2.00@	2.50
2½x4 in.....	2.50@	2.50
2x5 in.....	2.00@	2.00
2x6 in.....	2.00@	2.00
2x7 in.....	2.50@	2.50
2x8 in.....	4.00@	4.50
2x9 in.....	1.00@	2.00
2x10 in.....	3.00@	3.50
3x4, 3x6, 4x4 in.....	1.50@	2.00
1x1½ in.....	4.50@	4.50
1x2 in.....	4.00@	4.00

SPRUCE—(Continued)

No. 1 and Clear.

1x4 in. and up.....	\$2.00@	\$4.00
5/4 in. and up.....	2.00@	4.00
2x4 in. and up.....	2.00@	4.00

No. 3.

1x4 in. and up.....	\$3.75@	\$4.75
5/4x4 in. and up.....	4.00@	5.00
2x4 in. and up.....	4.50@	5.50
Dressing, 6 in. and up.....	\$0.50	
Dressing, 5 in. and under.....	.50	

SPRUCE (EASTERN).

Random Cargoes Delivered New York.

2 in. cargoes.....	\$3.00@	\$3.00
6 to 9 in. cargoes.....	—@	1.00
10 and 12 in. cargoes.....	4.00@	5.00

SPRUCE (West Virginia).

F. O. B. New York Within Lighterage Limits.

2x4, 10 feet.....	\$1.50	
2x4, 18 and 20 feet.....	1.00	
2x6, 10 and 14 feet.....	1.00	
2x8, 12 and 14 feet.....	1.00	
2x10, 10 to 16 feet.....	2.00	
8x8 and under, 18 and 20 feet.....	2.50	
9 and 10 in., 18 and 20 feet.....	4.00	
12 in., 18 and 20 feet.....	2.50	
1x2 shingling lath, rough or dressed on side.....	1.00	
4/4 box boards, rough.....	3.00	
4/4x6 in. merchantable quality.....	2.00	
4/4x10 in. merchantable.....	3.00	
4/4x12 in. merchantable quality.....	2.00	

YELLOW PINE—MERCHANTABLE 1905.

F. O. B. New York.

8 in. and under.....	\$1.00@	\$2.00
10 in.....	1.50@	3.50
12 in.....	2.00@	4.00
14 in.....	5.00@	7.00
16 in.....	3.00@	8.00
Ship stock—easy schedules.....	5.00@	5.00
Ship stock—40 ft. average.....	6.00@	6.00
Kiln dried sap siding, 4/4 in.....	.50@	1.00
Kiln dried sap siding, 5/4 in.....	.50@	.50

NORTH CAROLINA PINE.

F. O. B. Car or Vessel at Norfolk, Va.

	No. 1.	No. 2.
4/4 edge, under 12 inches.....	\$2.50	\$3.00
4/4 wide edge, over 12 inches.....	2.00	2.00
4/4x4 and 5 inches.....	.50	2.00
4/4x6 inches.....	2.00	3.50
4/4x8 inches.....	3.00	3.50
4/4x10 inches.....	2.00	2.50
4/4x12 inches.....	1.00	1.50
5/4 edge, under 12 inches.....	3.50	4.00
5/4 wide edge, over 12 inches.....	1.50	3.00
5/4x6 inches.....	2.50	2.00
5/4x8 inches.....	1.00	2.00
5/4x10 inches.....	2.50	2.00
5/4x12 inches.....	2.00	2.00
6/4 edge.....	2.00	2.50
6/4x10 inches.....	1.50	1.50
6/4x12 inches.....	1.50	2.00
8/4 edge.....	2.00	2.50
8/4x10 inches.....	1.00	3.00
8/4x12 inches.....	1.50	1.50

DRESSED NORTH CAROLINA PINE.

F. O. B. Cars or Vessel at Norfolk, Va.

	No. 1.	No. 2.
Flooring.....		
13/16x2½ in. and 3 in. flooring.....	\$3.00	\$3.50
13/16x3½ in. flooring.....	2.50	3.00
13/16x4 in. and 4½ in. flooring.....	2.00	3.00
13/16x3 to 4 in., jointed.....	2.00	3.00
13/16x3½ in., rift.....	4.00	4.50
1 1/16x all widths.....	3.00	4.00

CEILINGS AND PARTITION.

	No. 1.	No. 2.
13/16x all widths but 3½ and 5½.....	\$3.00	\$3.50
13/16x3½ in.....	2.50	2.50
13/16x5½ in.....	3.00	3.00

CEILINGS.

	No. 1.	No. 2.
¾ (for 5½ in. add \$2).....	\$2.00	\$1.50
½ (for 5½ in. add \$2).....	\$2.50	2.50
7/16 (for 5½ face add \$1.50).....	3.00	2.00
¾ (for 5½ face add \$1.50).....	2.50	2.50
German siding, 13/16x5½ in.....	3.00	3.50
Bevel siding, ½x4 to 6 in.....	3.00	3.00
Moulding casing, 1x4 to 10 in.....	3.50	4.50
4/4x4 and 5 in., S4S.....	5.00	5.50
4/4x6 inch.....	4.50	4.50
4/4x7, 8 and 9 inches.....	3.50	4.50
2x3 and 2x4 rails, S4S.....	4.00	4.00

SURFACED BOARDS.

	No. 1.	No. 2.
4/4 edge, under 12 inches.....	\$3.50	\$3.50
4/4 wide edge, over 12 inches.....	3.00	1.00
4/4x8 inches, stocks.....	4.00	4.50
4/4x10 inches, stocks.....	3.50	4.50
4/4x12, stocks.....	2.50	3.00
5/4 edge, under 12 inches.....	3.50	4.00
5/4 wide edge, over 12 inches.....	2.50	4.00
5/4x10 inches.....	4.00	3.50
4/4x12 inches.....	3.50	3.50
6/4 edge.....	3.00	3.50
6/4x10 inch stocks.....	3.00	3.00
6/4x12 inch, stocks.....	3.00	3.50
8/4 edge.....	3.00	3.50
8/4x10 inch stocks.....	2.50	4.50
8/4x12 inch stocks.....	2.50	3.00

ROOFERS.

	No. 4.
13/16x4 to 9 in. face.....	\$1.00
13/16x5½ in. face.....	2.00
13/16x any special width under 7½.....	2.00
13/16x7½ in. face.....	2.00
13/16x any width bet. 7½ and 9½.....	2.00

13/16x9½ in. face.....	2.00
13/16x any width bet. 9½ and 11½.....	2.00
13/16x11½ in. face.....	2.00
Box ask strips, surfaced 1st and 2ds.....	13.00

FACTORY FLOORING.

1½, 2, 2½ and 3x5 to 9 in.....	\$1.50
To finish ¼ in. scant in thickness and ½ in. scant in width for spline.....	1.50
¾ in. for T. and G.....	1.50
Splines \$3 per 1,000 ft. lin.....	1.50

MOULDINGS.

No. 1 per in., 100 ft. lin.....	\$2.00
National Moulding Book Standard.....	2.00

HONDURAS AND MEXICAN MAHOGANY LUMBER.

	First and Seconds.	No. 1, Common.	No. 2, Common.
½ in.....	\$15.00	\$15.00	.....
¾ in.....	15.00	15.00	.....
¾ in.....	15.00	10.00	\$5.00
4/4 in.....	15.00	10.00	5.00
5/4, 6/4 and 8/4 in.....	20.00	15.00	10.00
10/4 and 12/4 in.....	25.00	25.00	15.00
14/4 and 16/4 in.....	30.00	.....	.....
First and Second Shorts, 2 in. to 5 in. Long.....			
5/4 in., per M. feet.....			\$5.00
4/4 in., per M. feet.....			20.00
5/4, 6/4 and 8/4 in., per M. feet.....			20.00

OAK (PLAIN).

Mixed Rock, Mountain or W. Va. Stock.

4/4 in. 1st and 2ds.....	\$5.00@	\$5.00
5/4, 6/4 and 8/4 in. 1st and 2ds.....	5.00@	5.00
4/4 in. No. 1, common.....	3.00@	3.00
5/4, 6/4 and 8/4 in. No. 1, common.....	3.00@	2.00
4/4 in. No. 2, common.....	3.00@	4.00
5/4, 6/4 and 8/4 in. No. 2, common.....	4.00@	4.00
Ind. and So. strictly white 4/4 in. 1st and 2ds.....	6.00@	7.00

POPLAR, YELLOW (ROUGH).

F. O. B. New York.

1 in. 1st and 2ds, 7 to 17 in. and up.....	\$1.00@	—
7 in. No. 2, common or culls.....	1.00@	\$1.00
1½, 1½ and 2 in. No. 2, common or culls.....	1.00@	1.00

RED CEDAR.

F. O. B. New York and Points Common.

SHINGLES.		
Perfections	\$0.55@	\$0.45
Furekas	.40@	.30
Star A Stars	.15@	—
Extra clears	.20@	.05

Erecting Moderate Cost Detached Houses

The very pertinent comments which follow are taken from Bulletin No. 13, issued by the North Western Expanded Metal Company in the interests of expanded metal construction:

One of the greatest problems now confronting our architects and builders is that of erecting at a moderate cost detached houses that will be acceptable to those who have a moderate income. There is a large field for this class of construction, for the majority of people cannot build expensive homes. The stucco house built without sheathing is one of the systems that is meeting these conditions.

Until recently it was considered the height of folly to think of employing an architect to plan a low-cost house, and perhaps this has been due to the indifference of many architects to this class of work. It is easy to find at the present time architects who are specializing in the design of moderate cost homes. The satisfaction of having a properly planned and built house is so apparent that many people are having architects plan their homes.

Principles of drying lumber at atmospheric pressure are presented in Bulletin No. 104, recently issued by the United States Department of Agriculture at Washington, D. C. This is one of the Forest Products Laboratory Series, and the matter was prepared by Harry D. Tiemann, in charge of timber physics. The Forest Service has for a number of years made experiments in drying lumber on a small scale, and has reached what are believed to be fundamental principles. To learn how these principles may best be applied in commercial practice two series of experiments have been undertaken and the conclusions already reached have been published as a guide for those who have to do with the problem of drying lumber.

INTERESTING LITTLE CHATS WITH BIG BUILDERS

A Chicago Builder Who Has Well-Defined Ideas as to the Important Essentials of Successful Contracting

PROBABLY no man has had greater opportunities to study the growth of the building industry in Chicago than Hugh D. Moreland, a well-known contractor in that city. Mr. Moreland's experience in Chicago dates back as far as 1879, and prior to that time his activities were distributed over many territories and in a few professions.

He was born in 1859 at Goderich, Ont., and spent the first seventeen years of his life in that vicinity. His entrance to the business world was as a millwright's apprentice and succeeding that the mastering of the art of stone masonry was prominent in his endeavors. Profiting by his many experiences, he became an engineer at the age of eighteen and it was soon after that event that he crossed the border and has remained a citizen of the United States ever since.

In 1879 he went to Chicago when the population of that city did not exceed 500,000. When reviewing his early life Mr. Moreland said: "About that time there was quite a boom in Chicago, and having a fair knowledge of the building trade, acquired by practical methods, I went post-haste to investigate conditions. I found them reasonably good and prospects for future development were encouraging and fair wages were being maintained."

His first experience in Chicago was as a journeyman stone layer, a trade which he followed for many years. Some six or seven years after his arrival he entered business for himself as a mason and general contractor and results have proven that his move was a successful one.

The impression uppermost in Mr. Moreland's mind is the evolution of concrete. He stated that when he first entered the business concrete was practically unknown and his constant association with that material has created this impression.

Mr. Moreland's work during the past thirty years has covered a large field, but special attention has been given by him to the construction of residences, stores, cold-storage warehouses and factories. In speaking of the present methods of excavating Mr. Moreland had only praise for them and smiled when recalling the old way of breaking ground with hand shovels.

On being asked his view of conducting a contracting business successfully he said: "I think the two most important essentials are honesty and thoroughness, for fundamentally a man must have sound principles. It is my aim at all times, whether making a profit or loss on any contract, to do the work thoroughly and on the square. I always feel that my reputation is at stake, and in undertaking the construction of any building I figure I am setting a precedent. In business methods as in building, a concrete foundation is absolutely necessary. I advocate also a persistent policy

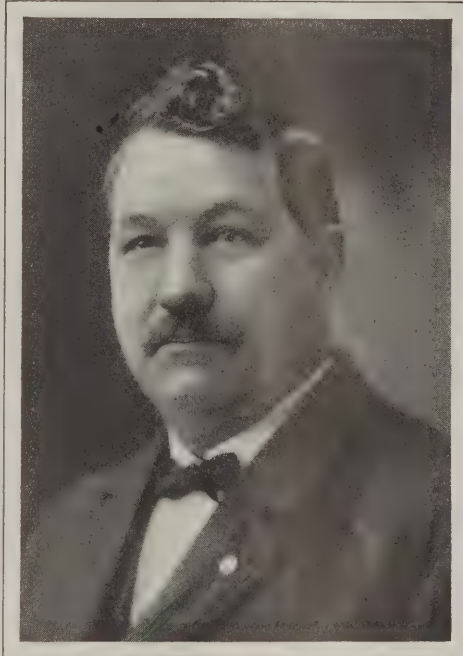
at all times. 'Stick to it,' is my motto. It has always been my endeavor to master the art of perfect construction. The question of having sufficient capital to carry on a profitable business is all-important, and no man should attempt to conduct one without a financial basis."

Constructing fireproof warehouses is a specialty of Mr. Moreland's, and he has followed closely the development of this class of building. He referred to the remarkable changes that have come about in this direction; of how formerly all buildings of this kind were of mill construction and of the predominance at the present day of steel and reinforced concrete construction. His views as to the progress of building interests are optimistic.

Mr. Moreland has been closely affiliated with the Chicago Masons and Builders Association for the past seventeen years, during which time he has held a number of prominent offices. When asked if he had ever been president, Mr. Moreland said: "I have had the opportunity, but I always felt that I never had sufficient time to devote to such an important position. Among those which I have held is that of director for the past seventeen years. I have been connected with the association since its early youth, when members were few and precious. Organization and cooperation are essential in all trades. The interchange of ideas—the establishment of precedents and other benefits derived from such association are all in the interests of the members and the profession as a whole. The cultivation of friendship among competitors cannot be other than beneficial in the long run."

Mr. Moreland recalled the establishment of rules and ordinances that have been in operation during the past twenty years. He said that formerly construction work was often done without the least consideration as to weather conditions and their effect on the structure. He stated that nowadays no cement is put in where the temperature falls below 25 deg. and no masonry when lower than 20 deg. This rule went into effect about 1898 through the efforts of the Chicago Masons and Builders Association and the Board of Education.

Mr. Moreland is strongly in favor of labor unionism, provided the officials of such organizations are scrupulous men and whose aim is for progress. When talking of present-day opportunities and how apprentices and others should take advantage of them, he said, "The young man of the present day engaged in the building industry has many more opportunities than we had years ago. With the advanced methods of this age a boy can accomplish great things by careful observation, study and adaptability. No young man has any excuse for not mastering the rudiments of the



Hugh D. Moreland, One of Chicago's Successful Builders

business which are absolutely essential to success. In former days all our knowledge was acquired in a practical way and our success depended on our capacity for retaining such information. These conditions have been largely brought about by the energy of those of the old school."

Mr. Moreland's talk continued along the line of co-operation of contractors engaged on the various stages of construction. He said that many strikes can be avoided if contractors will only realize that finally such cooperative conditions will come about so that the sooner they begin such a movement the stronger the industry will become.

Mr. Moreland also thinks that the success of any builder's business depends a great deal on accuracy and the consideration of the many important details incidental to construction work. The selection of efficient help should play an important part and the knowledge gained by former experiences in all branches of work should be a guide for all future contracting. He also said, "I consider that all plans should be drawn accurately and when drawn they should be carefully studied to see that they are correct and no important details omitted. These omissions do occur in plans and with fluctuating conditions in material markets it is often a struggle to break even on a contract.

CONSTRUCTIVE DETAILS OF A ROLL-TOP DESK

A Piece of Fine Work the Cabinet Maker or the Carpenter May Occasionally Be Called Upon to Execute

By EDWARD H. CRUSSELL

IT is to be hoped that the descriptive data and drawings here presented relating to the construction of a roll-top writing desk will be of assistance to "A. W. S.," Paterson, N. J., whose request appeared in a recent issue of the paper. I think his questions can best be answered by describing the construction of a desk from start to finish, for he can alter the design or dimensions to suit his own particular requirements.

Referring to the accompanying sketches, Figs. 1 and 2 show front and end elevations of an average style of desk. It has four drawers in the left pedestal and one drawer and a book cupboard in the right. Both pedestals have also a sliding board or leaf at the top, sometimes called an "arm-rest" and sometimes an extension writing surface. In some cases the cupboard is omitted and drawers are used in both pedestals. The two lower drawers in the right pedestal are often formed into one large drawer, the front of which is made to appear as two drawers, so that both pedestals will have the same outside appearance.

The size of the desk in Figs. 1 and 2 is 48 in. long, 30 in. wide and 48 in. high over all. The writing surface is 30 in. from the floor.

Other sizes for this style desk are 50 in. long by 32 in. wide; 54 in. long by 34 in. wide, and 60 in. long by 34 in. wide, the height remaining the same for all.

The width of the "knee-hole" should not be less than 20 in. and in larger desks may be 24 or 26 in.

In Fig. 3 is shown a different outline for the roll top. It is perhaps a little easier to make than the one with a double curvature and in the opinion of the writer looks better. This style of top is 3 to 4 in. less in height than the other, the writing surface remaining 30 in. from the floor as before.

The desk is preferably made in sections and fixed together with screws so as to permit of its being easily taken apart for moving through doorways, up and down stairs, etc. The sections consist of a top—containing the roll curtain and writing surface—two pedestals and a paneled board which fits in between the pedestals at the back. A cross section of this board and the pedestals, taken just above the bottom rail, is shown in Fig. 4, which also indicates the manner of fixing the corners of the pedestals together.

The sides of the pedestals are framed up as in Fig. 5, which shows one of the outer sides, the minor ones being $\frac{7}{8}$ in. less in width to allow the back of the pedestal to project as in Fig. 4. The muntin between the panels in Fig. 5 is shown mortised into the top and

bottom rail about 1 in. In cheap work this muntin merely has a tenon as long as the depth of the plow groove in the rail and is slipped into place the same as the panels. All the mortises shown in Fig. 5 are blind ones; that is, they are cut only part way through as indicated by the dotted lines, and of course the projecting ends of the stiles shown are cut off as soon as the sides are ready to be built into a pedestal. They are left on it in the first place for greater ease in working the mortises, which being so close to the end are liable to break out during the process of cutting.

The panels of the desk are of the same thickness as the framing and are worked so as to come flush on the inside and show a raised panel on the outside. This, however, entails a lot of work, to avoid which other thicknesses of panels may be used. Material $\frac{5}{8}$ in. thick will allow of a raised panel on the outside as at "A" in Fig. 6 or a flush panel on the inside and a sunken panel on the outside as at "B." Material $\frac{3}{8}$ in. thick will, by being beveled on the inside edges, make a panel that is sunken on both sides. The grooves in the stiles are only $\frac{1}{4}$ in. wide, but $\frac{1}{4}$ -in. material is hardly suitable for panels unless it can be obtained in the form of three-ply veneers.

The style of panel which comes flush on the inside makes a little the best job because it affords a flat surface on which to fix the drawer runners. The latter are of $\frac{7}{8} \times \frac{3}{4}$ -in. material and are fixed to the sides with screws as in Fig. 7, which shows the small mortises that receive the tenons on the ends of the drawer divisions.

An enlarged detail of one of these division strips is shown in Fig. 8. A single tenon can be used instead of the double one but the latter makes a little the best job. The 3-in. rail at the bottom of the pedestal front is fitted with a dovetail, as is also the strip above the sliding leaf at the top. After the drawer divisions are in place and these two pieces have been driven home, the front of the pedestal is locked together in a very satisfactory manner.

The form of dovetail used on the bottom rail is shown in Fig. 9. The top strip lying flat is fitted with the common form which is too well known to need illustrating. It is not, however, usual for desk manufacturers to put in this top piece, the more general way being to omit this strip and allow the "arm-rest" to come directly under the desk top. When the strips are used they offer an easy method of fastening the pedestals to the top because the screws can be passed

straight through the strips from the under side. They also provide a place to "plant" a small molding around under the top, if this be desired.

In the pedestal containing the cupboard the unnecessary drawer slides and divisions are omitted and after the pedestal is put together the book stalls are constructed as in Fig. 10 and slipped into place. They are held in position with screws and a $\frac{1}{4}$ -in. bead or other small molding may be bradded around the front edge to hide the joint. These book stalls are usually made of pine or other soft woods.

The sliding arm-rest should be made as in Fig. 11, which shows it in plan and section. The grain in the center portion runs cross-ways of the board and in the desk which the writer has in mind this center portion is of soft wood covered with imitation leather. The mitered corners of the outside rim may be held together with a hardwood dowel, which will answer the purpose just as well if put in after the corner has been glued and cramped together. This outer rim may be mortised and tenoned together, if so desired, in which

called *Carpentry and Building*—he will there find the subject treated fully under the heading "The Jobbing Carpenter and Some of His Work."

The arrangement for locking all the drawers automatically is shown in front and side elevations in Figs. 14 and 15. It consists of the piece "A," which is $1\frac{1}{4}$ to $1\frac{1}{2}$ in. square and fitted to slide easily but not loosely in the pieces marked "B" and "C." These pieces are about 1×3 in. in cross section and are fixed across the back of the pedestal at the top and bottom as shown by the section lining in Fig. 17.

A metal catch of the shape shown in Fig. 16 is secured to the back of each drawer and corresponding pins are fixed in the side of the piece "A" of Fig. 14. These pins may be plain pieces of stout iron wire or round headed screws as indicated. A coil spring is placed on the foot of the piece "A" of Fig. 14, pressing



Fig. 6.—Horizontal Section Through Different Panels

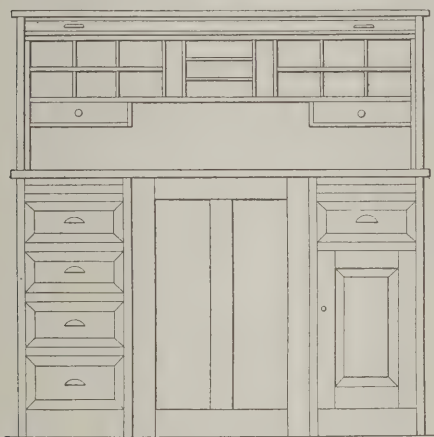


Fig. 1.—Front Elevation of Desk Showing Roll Top Open—Scale 9/16 In. to the Foot

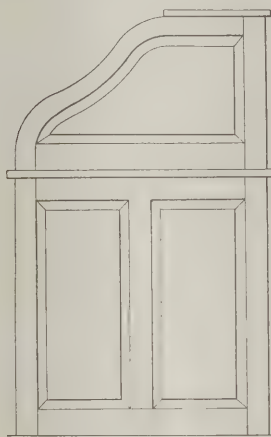


Fig. 2.—End Elevation of Desk—Scale 9/16 In. to the Foot

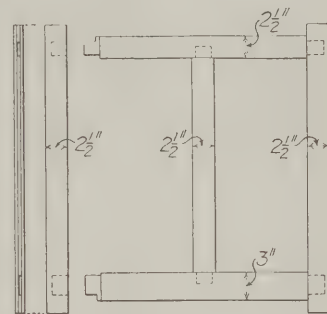


Fig. 5.—Details Showing Construction of Side of Pedestal

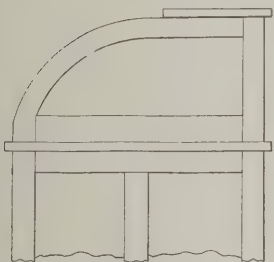


Fig. 3.—Another Style of Roll Top

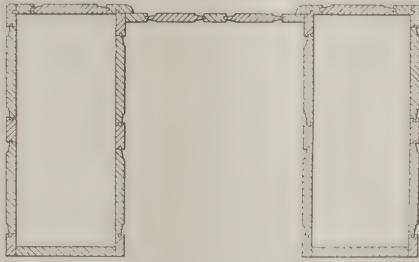


Fig. 4.—Horizontal Cross Section of Desk

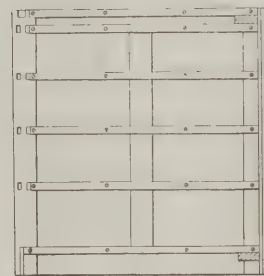


Fig. 7.—Inside of Pedestal Showing Drawer Runners and Other Details

Constructive Details of a Roll-Top Desk

case the front piece runs right across and carries the mortises, the sides being tenoned into it.

One of the drawers is shown in Fig. 12. The front is $\frac{7}{8}$ in., the sides and back $\frac{1}{2}$ in. and the bottom $\frac{3}{8}$ in. thick. All the interior woodwork is usually of soft wood, but it makes a better running drawer if hardwood is used for the sides, while the difference in cost is next to nothing. A longitudinal section through a drawer is shown in Fig. 13. The grain of the wood in the bottom should run cross-wise of the drawer in all cases and it should be a tight fit in the groove provided for it. This is best accomplished by making the groove $\frac{1}{16}$ in. smaller and beveling the under side of the bottom to fit. The bottom is made fast to the drawer front only and left projecting a little at the back, thus allowing it to swell or shrink without splitting.

The construction of the drawer is shown quite clearly in Figs. 12 and 13 but if further information is needed and the correspondent has or can obtain a copy of *The Building Age* for September, 1909—at that time

against "C" and held in place with a pin through "A." The piece "A" is also provided with a stop-pin at the top to prevent the spring raising it too far for the catch, Fig. 16, to engage the pins. The top of the piece "A" projects upward through the desk top, behind the pigeon holes and directly in line with the groove in which the roll curtain travels. When the curtain is down or closed the spring forces "A" upward, causing the pins to engage the catches on the backs of the drawers. When the roll curtain is unlocked and pushed back it rests on the ends of the projecting pieces "A"—one in each pedestal—compressing the springs and disengaging the pins from the catches, and thus allowing the drawers to be opened. The springs can easily be made by taking a short length of steel or hard brass wire and twisting it a few turns around a cylinder of the proper size. The closer the coils are made the stiffer the spring and vice versa. The catches are made with beveled ends so that a drawer may be pushed into place and locked even after the roll-curtain has been closed.

There is another form of lock which has no springs but is only suitable for a desk made all in one piece. In it the hooks are attached to the piece "A" and engage the backs of the drawers. A short lever is attached to "A" with its free end projecting upward in the path of the roll-curtain; when the curtain is pushed back it depresses the free end of the lever and raises the piece "A," thus releasing the drawers.

Still another form of lock—not usually seen on roll-top desks—is one in which the top drawer in the pedestal locks all the others. The piece "A" is arranged exactly as in Figs. 14 and 15 but without the spring, so that the normal position of "A" is at the release with a stop pin resting on the piece "C." All the drawers are fitted with the catch shown in Fig. 16 except the top one and this has a beveled lug projecting from the back which presses against the under side of the top pin, thus raising the piece "A" and locking all the lower drawers. To release the drawers, it is necessary to unlock the top one and draw it out a short distance.

This completes our discussion of the lower portion of the desk with the exception of the paneled board which fits in between the pedestals. As this is exactly

router and is best cut after the side has been framed and glued together. The groove which receives the edge of the panel is cut with a chisel of the correct width in the same manner that one would cut a mortise. If one can get the use of a foot power mortising machine the groove can be cut quite easily.

The desk top, which to avoid confusion I have called the "writing surface," can either be glued up solid, or it may consist of an outside rim of hardwood properly framed and fixed together and having a soft wood center covered with imitation leather, as described for the slides in the pedestals.

The leather may be fastened in place with liquid glue, as ordinary glue sets too fast to allow of its being used for this purpose. Paperhanger's paste such as is used for hanging burlap is also good, but to the woodworker the liquid glue offers the least bother.

Veneering might be suggested for a desk top instead of solid wood, but veneering requires special knowledge

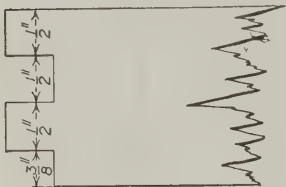


Fig. 8.—Detail of Division Between Drawers—Scale 6 In. to the Foot

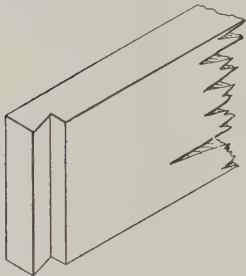


Fig. 9.—The Dovetail Used on the Bottom Rail of the Pedestal

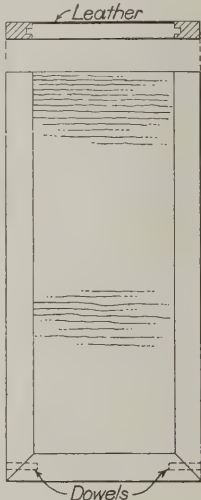


Fig. 11.—Plan and Section of Arm Rest

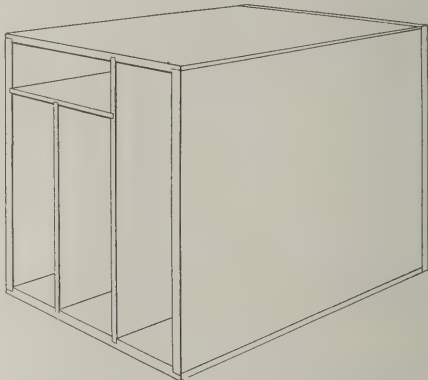


Fig. 10.—Perspective Showing Book Stalls in the Cupboard

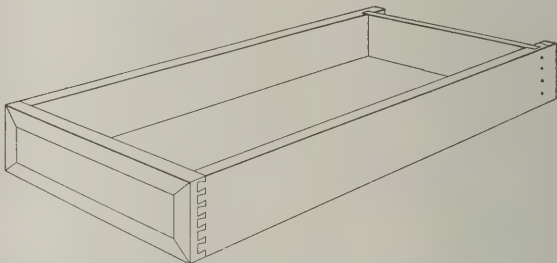


Fig. 12.—Perspective of One of the Drawers

Constructive Details of a Roll-Top Desk

the same as the sides of the pedestals excepting in width there is little to say regarding it unless we mention that "through" mortises may be used instead of blind ones, if they are found easier to make. Often a shallow drawer is made and fitted directly under the desk top in between the pedestals and that sometimes when the drawer is omitted a narrow strip with bracket shaped ends is fitted in its stead.

A cross section of the top of the desk is shown in Fig. 17. It will be best to draw the outline of this full size on a sheet of paper, sketching in the curves free-hand. After the correspondent has them to suit, the paper can be laid on top of the material to be marked and the lines transferred either by means of carbon paper or by going over the outline with a dressmaker's tracing wheel, which will reproduce the lines on the material in a series of dots. The curved front rail can be cut in one piece from a board 10 in. wide. It is joined to the stile at the back by mortise and tenon and to the rail at the bottom with two hardwood dowels, the latter form of joint being the best at this place on account of "the way of the grain."

The curved groove in which the roll-curtain works is gauged from the front edge to show an equal margin. It will have to be carefully cut with chisel and

and appliances and for a single job the extra work required for veneering would more than offset the difference in price between a veneered top and one built solid.

The roll-curtain is composed of strips $\frac{3}{4}$ in. or less in thickness by $\frac{7}{8}$ in. in width. The bottom strip is $\frac{7}{8} \times 2$ in. to provide room for the lock and hand holes. It must be reduced at the ends sufficiently to permit of its traveling in the groove and all the strips must be rounded at their edges as in Fig. 18 for the same reason. The strips are all held together on a piece of stout canvas which is fastened to the back of them with glue and small tacks. The curtain requires no weights or other attachments—it own weight being sufficient to carry it in either direction after it has been moved past the center. It will perhaps be found to work stiff and jerky after the desk has been varnished, but if it does, rub the groove well with a cake of beeswax. The pigeon holes are made of pine, using $\frac{1}{2}$ in. for top and sides, $\frac{3}{8}$ in. for shelves and back and $\frac{1}{4}$ in. for divisions. They are made separate from the desk and fixed in place like the book stalls in the cupboard.

The back of the top is formed of a paneled frame which is fitted to the ends in the same manner as the backs of the pedestals. The top board is fixed to the

back and sides with screws that are run in at an angle from the under side. Small soft wood blocks are also fitted and glued in the angles formed by these various pieces. These blocks are an important factor in holding the various pieces rigid and square and should be used wherever they can be placed without being seen, both in the pedestals and upper portion.

After the roll-curtain is in its groove the writing surface can be fixed to the back and sides with screws. It need only be fixed temporarily until the pedestals and top have been assembled and the working of the various parts proved correct.

The foregoing covers most of the points likely to crop up and the writer will close the subject with a few general remarks upon the way he would handle a job of this kind. The first work after a careful examination of the drawings would be to make "settingout rods" for the various parts. The next would be to make a careful and correct bill of material showing the size of every piece. Then with the material at hand commence cutting it up, starting with the largest and most important pieces and working on down to the smallest and most insignificant, which will usually take care of themselves. The writer is supposing the desk to be made by hand and would in most cases prefer to get the material for

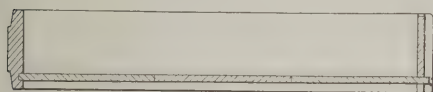


Fig. 13.—Horizontal Vertical Section Through One of the Drawers—Scale 9/16 In. to the Foot

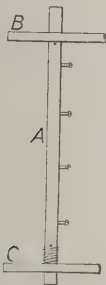


Fig. 14.—Front View of Automatic Drawer Lock



Fig. 15.—Side View of Automatic Drawer Lock



Fig. 16.—Perspective of Metal Catch for Back of Drawer Shown One-Half Full Size

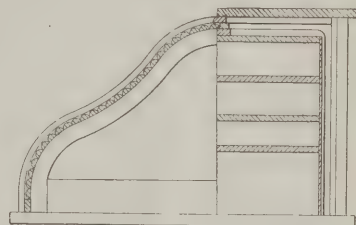


Fig. 17.—Vertical Cross Section of Upper Part of Desk



Fig. 18.—Partial Cross Section of Roll Curtain—Scale 3/8 Full Size

Constructive Details of a Roll-Top Desk

his framework in the rough. This is in direct opposition to the advice given in most articles of this kind, but there is a reason for it.

It is absolutely impossible to have the framing flat and level and without twist unless every piece of which the framing is composed has been taken "out of wind" before it is plowed, mortised or tenoned, as the case may be. Machine dressed lumber has just as much twist in it as rough lumber and must be straightened in the same way, the difference being that rough lumber is approximately 1 in. thick, while machined lumber does not usually run more than 13/16 in. and if there is much twist in it will have to be dressed down until too thin for use.

Do all of the dressing at one time and as far as possible follow along that line with all the other operations required. All the mortising, tenoning, plowing, etc., should be done at the one time and in its proper order. Do not fix any of the parts permanently together until you are positive all the required work has been done on them. Most of us are anxious to see how the thing is going to look, and after we have it together we sometimes find that there is a mortise to be cut in some inaccessible part or something of a like nature.

All of the various phases of work contained in this job, such as jointing, gluing, taking out of wind, mortising, dovetailing, etc., etc., have been fully described in some portion of the serial article entitled "The Job-

bing Carpenter and Some of His Work" which appeared in back volumes of this paper. Such matters as fitting locks, making "settingout rods" and bills of material were also covered in that series. If the correspondent in question has access to the issues containing these articles a perusal of them may be of assistance.

An Improved Trade School Course

The State Trade School at Bridgeport, Conn., has made an important innovation by giving its students in the regular mechanical course the right to enter the shops of the city as apprentices for one year, at the third year rate of apprentice wages, with a diploma as graduate journeymen as the final reward.

The school has two mechanical courses, that of the regular trade school, covering two years, and the half-time course of three years. The final apprenticeship year combines in the regular course the advantages of both. The half-time boys divide their day between the class room and the shops of the city. The other students do their practical work in the school's excellent shops.

A lad gets a sound training in the basic studies, including mathematics as the principal feature, and a very practical course in the shop and drafting room. At the end of two years he has acquired a good foundation of knowledge in which theory and practice are

wisely commingled. However, he has not had the same influence of real industrial environment as the boys of the half-time school, much of whose effort has been in an atmosphere of high tension production. The third year as an apprentice supplies a most essential element of training. The two years' course stands the lad in good stead.

It has been found by the manufacturers in whose works these post-graduate courses are pursued that the trade school boy is at a real advantage over his regular apprentice associates of the third year. He has a better knowledge of the scientific principles involved in the work and its preparation; of costs of materials and labor; of the reading of drawings, etc. The manufacturers of Bridgeport got together before the supplementary year was decided upon and agreed to the plan in its relation to their works. It has been demonstrated that a large percentage of these boys stick to the plants where their diplomas were granted.

At a meeting of the Association of Dealers in Building Materials held Thursday, March 20, at 18 Broadway, New York City, Francis N. Howland was elected president; John A. Philbrick, vice president; Nathan Peck, treasurer, and J. D. Crary is the secretary.

Tampa, Fla., has adopted a new building code.

Association of Dealers in Building Materials

The New York State Builders' Material Dealers' Association held its annual meeting and banquet in Syracuse on the 27th of March. Officers were elected for the ensuing year as follows:

President.....George D. Elwell of Albany.
Vice-Presidents..M. T. Bannigan, Utica.
 B. J. Mitchell, Niagara Falls,
 W. J. Bullard, Binghamton,
 J. J. McCann, Poughkeepsie.
Secretary.....C. A. Baldwin, Ithaca.
Treasurer.....S. M. Hamilton, Buffalo.

Nearly 100 were present at the business meeting and reports received indicate that the coming building season will be a prosperous one among the members.

Commencement Exercises at the New York Trade School

That a deep interest in the training of young men in various trades exists, not alone on the part of the friends of those who are taking courses of instruction, but also by the general public, was strikingly demonstrated by the attendance at the thirty-second annual commencement exercises of the New York Trade School, which took place on Wednesday evening, April 2. Prior to the exercises of the evening the visitors inspected the work of the students in the various classes, which was exhibited on the benches and walls of the different class rooms and which brought forth favorable comment from all.

The exercises were opened by F. Augustus Schermerhorn of the Board of Trustees, who in his introductory remarks referred to the unavoidable absence of President R. Fulton Cutting, and paid a fitting tribute to the late J. Pierpont Morgan, who was a liberal participant in the endowment fund and who had manifested a deep interest in the school and its work.

The address of the evening was made by the Honorable William C. Redfield, Secretary of Commerce, who held the close attention of his hearers from start to finish. He opened by commending to the earnest consideration of the graduates the advice given by Mr. Schermerhorn and humorously referred to the peculiar subject he had chosen or at least the peculiar title he had selected for his speech.

"Hands versus Paws," sounded rather strange, he admitted, but in the next few sentences he had shown his hearers that the difference between them was that which defines the constructive and the destructive, that the human hand is the only appendage of nature in the animal kingdom which can lift up, and that the lower animals are simply provided with paws which strike down. He traced the influence of the skilled craftsman in the growth of the country and its gigantic manufacturing interests and on the part it must play in history.

The address was full of inspiration and help to young men and was received with enthusiasm. On its conclusion John Byrnes, of the New York Master Plumbers' Association, in a characteristic speech, presented the gold medal which is annually given to the student of the plumbing classes making the best record. The winner this year was Warren W. Uhler, Nazareth, Pa. Mr. Byrnes said that he had been engaged in the plumbing business for 62 years and he held the opinion that the present-day plumber is a far more capable tradesman than those of the much lauded "good old days." He referred to his early connection with the founder of the school, Colonel Auchmuty, and gave a résumé of the conditions which led to the foundation.

Honor rolls were presented the students in the various classes who had made a high ranking in their work by J. Roosevelt Roosevelt. The set of books on Build-

ing Construction constituting the prize given by a former graduate of the school, went to Vincent R. Grimes, of New York City, as the most proficient student in the class in carpentry. William de la Motte, of Red Bank, N. J., was awarded "Honorable Mention" as ranking next in this class.

It is interesting to note that there were 10 graduates in the class in carpentry, 5 of which were residents of New York City, 3 of the state of New Jersey, 1 from Pennsylvania and another from Brownsville, Texas. In the class in plumbing there were 73 graduates; in electrical work 41; in bricklaying 9; in cornice and skylight work 17; in sign-painting 9; in steam and hot-water fitting 5, and there was 1 graduate in the class in painting and plain decorating.

In the classes in pattern making, plastering and house painting the majority of the students this year were first and second term pupils, which accounts for their being either no graduates or comparatively few. In the evening departments it requires an attendance of three winter terms in order to complete the full course and secure a certificate of graduation.

Construction of Tenement Houses in New Jersey

The annual report of the New Jersey Tenement House Commission for the last year shows permits to have been issued for the construction of 1270 tenement houses costing \$11,951,000 and alterations to 440 buildings costing \$535,000. This is an increase of 185 in the number of new buildings and \$1,118,000 in the cost thereof as compared with the year before.

During the year 1075 three-story six-family flats were erected at a total of \$4,949,000. There were 335 three-story brick flats at a cost of \$2,838,000; 242 four-story brick flats costing \$3,736,000, and for five-story brick flats \$825,000 were expended.

Since the passage of the Tenement House Act in 1904 there have been 8728 new-law tenements constructed, the aggregate cost of which was \$81,242,000

The National Highways Association is pushing with commendable enterprise the project of a system of national highways and a general furtherance of the "good roads" idea. It is pointed out as the universal experience that one mile of good road breeds another mile and that if a system of national highways is built and maintained by the National Government the various state legislatures and county officials will soon see the advantages of connecting all parts of the states with those national roads.

New York architects have designed a hotel of Spanish Colonial architecture which will be erected by the Panama Railroad Company on Colon Beach at a cost of approximately half a million dollars. The building will be 300 ft. long with foundations of gravel concrete, walls of reinforced columns and beams, with hollow tile curtain walls, white cement stucco exterior finish, concrete floors and tile roof.

The new building for the National Board of the Young Women's Christian Associations, designed by Architect Donn Barber, will occupy the site at the northwest corner of Lexington Avenue and Fifty-second Street, New York City. It will cover a plot 100 x 125 ft. in size, will be 11 stories in height and will approximate \$500,000 in cost. The façades of the building are to be of limestone in the style of adapted Italian renaissance. The general contract is in the hands of Marc Eidlitz & Sons, New York City.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

Roofing a Round Silo

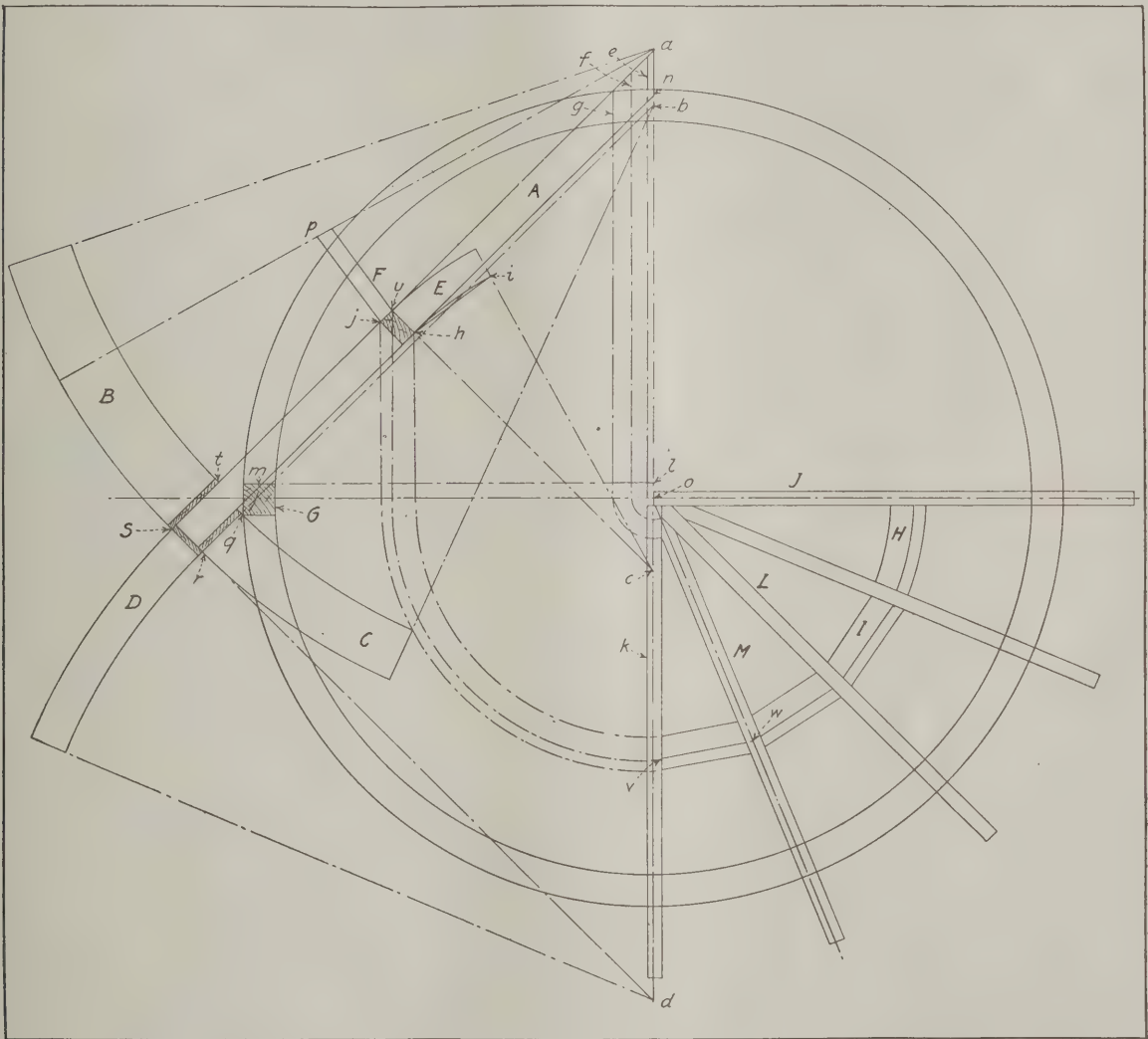
From W. S. W., Pleasant Ridge, Ohio.—I noticed in the February issue on page 79 under the above title a request from "R. L.," Brookville, Ind., as to the best way to roof a round silo and how to make the roof round, by which I suppose he means a conical roof.

As to the first question I cannot say just what would be the best way, but I can show him how to frame a

like the elevation *A*. The next pair *K* are cut the same, only half the thickness of the rafter shorter, or to the line *e*.

The next pair *L* has two bevels, the plumb cut being at the line *f* and the center of the rafter at the point is at the line *e*.

The next pair of rafters *M* has the plumb cut at the line *g* and the center runs to the line *f*.



Roofing a Round Silo—Contributed by "W. S. W.," Pleasant Ridge, Ohio

conical roof which I think will make him a good job.

Referring to the accompanying drawing, I have with *o* as center laid out a plan with the rafters shown on one quarter of it. With *m-r* as the run and *r-n* as the rise the reader will see the elevation of one of the rafters with a cross section of a purlin and a plate at *G*, the plancier *C*, the fascia *D* and the sheathing *B*.

The plate may be sawed out of 2 in. boards and nailing one on top of the other breaking joints we have a 4 x 4 in. plate as shown at *G*.

The first pair of rafters *J* are to the center or just

The rafters need not have any finish on the lower end, but if the correspondent wants it, lay out the plancier *C* with a radius *b-r* for the outside and *b-q* for the inside, which will make it just the right shape to bend around under the rafters; the pieces can be made any length. Always make the joints line up to the center *b*.

The fascia *D* and the sheathing *B* can be gotten out in the same way, using *a* and *d* as centers. If that kind of sheathing is used I hardly think there will be any necessity for purlins. The sheathing boards may

run parallel with the rafters, in which case the boards may be the same length as the rafters and rip from one corner to the other. In this way there will be no waste. Have the boards long enough to saw the bottom ends off afterwards, but in this case purlins will be needed—one as shown and one near the bottom end of the rafters.

The face of a purlin is shown at *E*. The face bevel is *c-h-i*. Use as a radius *c-u* for the top edge. This will be an arc of a circle which would be exact if the purlin was curved as at *H*, but they are straight as at *I*, so the top edge should be a parabolic curve. An arc of a circle with radius as shown will however be near enough for a short purlin.

The bevel on the top edge of the purlin is shown at *a-j-p*, but this length is from center to center of rafters, as shown from *v* to *w* on the plan. Take the length between the rafters from the plan. One might use a block in the center with as many sides to it as there are rafters and just set the rafters against it, making them all the same length, or you could make a ring against which to set the rafters, leaving a hole in the center for a ventilator.

Constructing an Ordinary Door Frame

From C. J. M., St. Johns, Newfoundland.—For the benefit of "W. E.," Brandon, Manitoba, who makes inquiry in the March issue of the paper as to the better of two methods of putting door frames together, I would say neither way illustrated by him is correct, for the reason that in both cases the whole thickness of the timber is housed in, which is bad construction.

Supposing, as is often the case, the studs were set with only half an inch of freedom or the lintel was set barely high enough to get the frame in. Then the ends of the sides or head, as the case may be, would have to be sawn off close and all the work of housing would be useless.

It was always the practice in any shop where I have worked to leave a haunch on the back of the housing, as shown in the accompanying sketch.

The correspondent says he fails to see the advantage of housing the head piece into the sides. I, too, fail to see almost anything until I put on my glasses. When I get them on, however, I can see plainly enough that in setting in door jambs I want all the freedom I can get on the sides for plumbing and the little bit of extra bench work if any saves the trouble of taking out the frame again and cutting another bit off the end of the head piece to get it to come just where I want it.

There is a right way and a wrong way of doing almost everything, but the very best way to do anything is to look ahead before you do it and see how it is going to affect something else on the job.

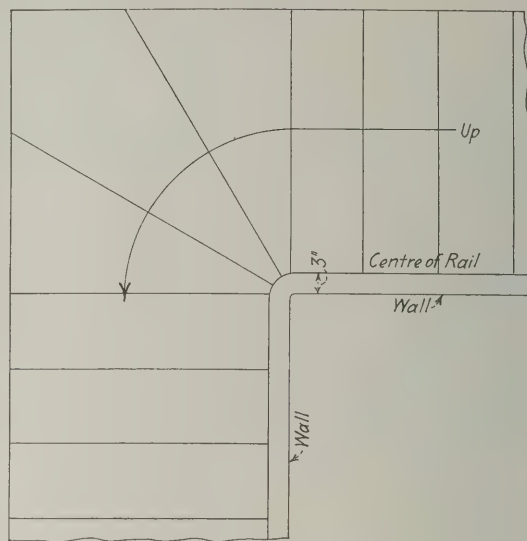
From J. McC., Knox, Pa.—In reply to "W. E.," Brandon, Manitoba, in the March issue of the paper I would say that openings for doors are generally made $\frac{3}{4}$ in. to 1 in. wider than the outside measure of the set-up jambs, in order to allow for straightening and plumbing and yet be close enough for securing to the studs, whereas the head generally has 2-in. room which is seldom if ever nailed to the header and need not be since the hinges and lock are always placed on the side jambs.

Problem in Hand Railing

From A. E. K., Lowell, Mass.—I would like to ask the readers of *The Building Age* the best way to lay out a piece of handrail over the plan which I enclose

herewith. The rail is $2\frac{1}{2}$ -in. square and the distance from the wall to center of rail is 3 in. The pitch is 11 in. cut and $7\frac{1}{4}$ in. rise.

I got out this rail by scribe rule method, but I know



Problem in Hand Railing

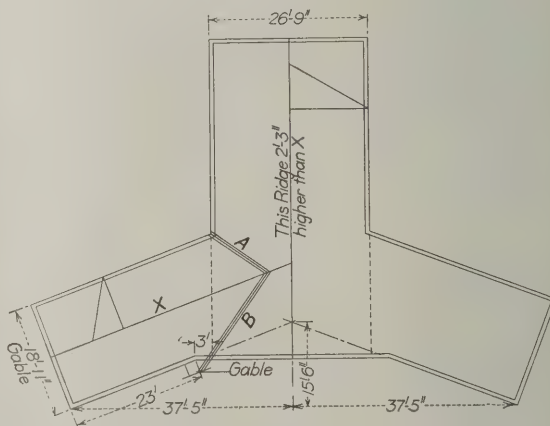
there is a better one than this, and I hope some of the readers may be able to explain how it may be done.

Plans Wanted for Lodging House

From J. G. S., Fort William, Canada.—I would like to have some of the practical readers furnish a plan for a lodging house four stories in height and about 48 x 40 ft. in area.

Finding Lengths and Cuts of Valley Rafters with the Steel Square without Drafting

From W. S. B., Colorado Springs, Colo.—I would like to have some of the sharps in roof framing tell me how to get the lengths and cuts of the valley rafters A



Finding Lengths of Rafters with Steel Square

and B of the accompanying sketch, making use of the steel square without drafting.

I would also like to see how others would draft for the same. The roof is of the same pitch—7 and 12—which makes the ridge of the main part of the building 2 ft. 3 in. higher than the ridge of the left hand gable. The point of the valley B intersects the cornice at C.

Building Window Seat over Radiators

From C. F. R., New York.—In reply to "O. R. M. G.," Chicago, Ill., who asks for a suggestion for the construction of a window seat over radiators, I would

say he can build a back to the seat 6 in. from the wall and as high as the window sill, returning it on the ends. Then on top he can place wire mesh, nailing it to the back and to the furring on the wall side. The capping or finish to the seat back and ends may be nailed on so as to cover up the edges of the mesh. The finish should be kept on a line with the window stool and should be of the same pattern of molding.

By building the back out 6 in., will necessitate bringing the seat into the room 6 in. if he wishes to have a seat 18 in. deep. This I consider a good feature because it brings the back of a person's legs seated further from the radiator and the heat from the radiator through the mesh at the back of the seat is thrown across the window front, warming the cold air that finds its way in around the windows.

I enclose a plan and section, Fig. 1, which will

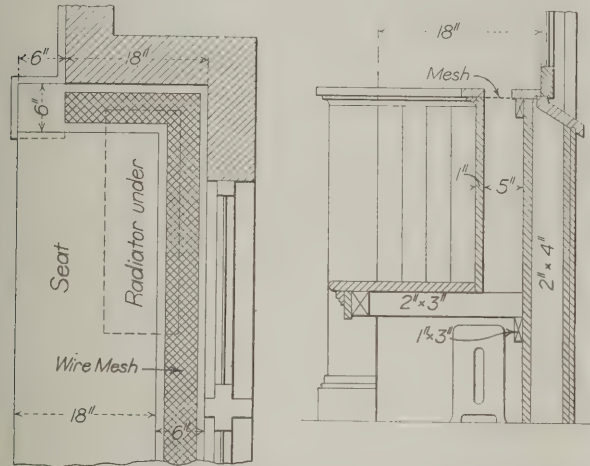


Fig. 1—Partial Plan and Vertical Section Through Seat Showing Method Suggested by "C. F. R."

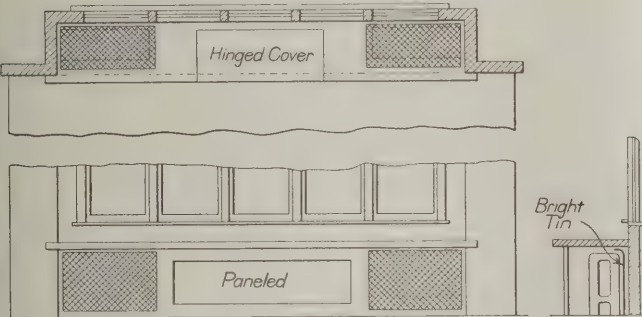


Fig. 2—Plan Elevation and Section Showing Construction Recommended by G. H. Wilson

Building Window Seats Over Radiators—Methods Suggested by Various Correspondents

readily explain my meaning. In the sketch I show pilasters where the seat projects into the room. The capping is carried around these, also the room base, which gives it a finish.

I would advise keeping all woodwork at least 1 in. away from the radiator; also cover the under side of the seat over the radiator with tin backed with asbestos paper if placed tight against the wood.

From G. H. Wilson, Denver, Colo.—Replying to "O. R. M. G.," Chicago, Ill., whose letter appeared a short time since, I should put in a seat the entire width of the bay window and over each radiator cut out an opening in the wood and set in flush two register faces of ample capacity. A hood or shield of bright tin should be placed at the back and ends of each radiator, curved forward and fastened to the under side of the seat at the back edge of the register. There may be as much as 5 in. of wood from the back edge of the register to the wall. I would also suggest that a wrought iron grille be placed in front of the radiators without in

any way interfering with their heating capacity. A wood panel can be made as a riser between and the space between the radiators can be utilized by cutting out and hinging a part of the seat. The sketches in Fig. 2 will help to render my meaning clear.

From J. B., Montreal, Canada.—Seeing the question asked by "O. R. M. G.," Chicago, Ill., in regard to the construction of a window seat over radiators, I am sending some sketches of a seat, Figs. 3 and 4, that I have made several times and it has worked to the entire satisfaction of all.

The seat is constructed of 1 1/4-in stuff in slat style and the front is of 7/8-in. panels with brass grille work, which allows the complete circulation of the air through the front and also up through the top.

One good feature is that the panels are portable and are fastened in with brass buttons, as shown in the elevation, thus allowing of their removal for dusing and free access to the radiators. The front may be left

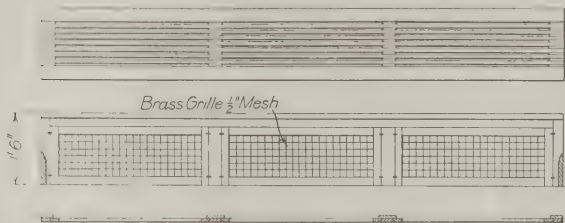


Fig. 3—Plan, Elevation and Section of Seat Accompanying Letter from "J. B."

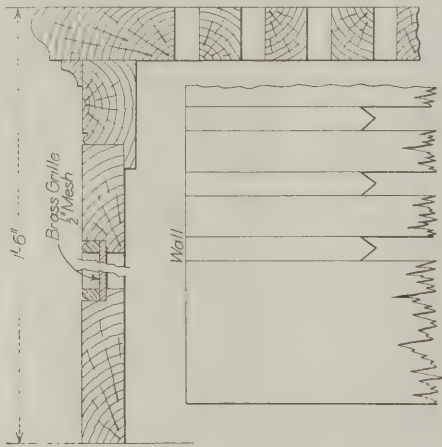


Fig. 4—Partial Plan of Top of Seat with Section Through It at the Front

open by placing turned legs with a rail 2 1/2 in. to support the top, if so desired.

Heavy Barn Framing of Long Ago

From Old Timer, Todd, Okla.—While the following comments may not prove of any great practical benefit to current-day readers of *The Building Age*, it may interest some of the younger element to know how heavy barn framing was done in the days of my early experience. A barn in those days was not built according to plans drawn by an architect, giving details as to strength of timbers, safe loads, strains, etc., but was constructed on the judgment of the carpenter who had the work in charge.

We will consider if you please the barn which was constructed of hewn timbers; that is, all timbers above 6 in. square. The crew went to the timber and having selected a tree suitable for a certain purpose, felled it and having lined it to the proper thickness they pro-

ceeded to score it to the line on either side, after which the person selected proceeded to hew the stick, while the choppers got another ready. After the stick of timber was "flatted," it was turned down and squared by again lining and hewing the other two sides. It was then checked on the "bill" and the same performance was gone through with until the entire bill was gotten out. The "nail girts" or "range timber," rafters and brace timber were sawn at some local mill.

The sizes of the timbers ran something like this: the basement posts, sills and girders supporting the upper structure were about $10\frac{1}{2} \times 10\frac{1}{2}$ in., except the girders which perhaps would be $10\frac{1}{2} \times 12\frac{1}{2}$ in., the extra $\frac{1}{2}$ in. being an allowance for taking out of wind and "boxing." The upper timbers would be $8\frac{1}{2} \times 8\frac{1}{2}$ in. for posts, plates and cross ties or girders; the purlin posts and plates would be $7\frac{1}{2} \times 7\frac{1}{2}$ in.; the beams over driveway, doors, etc., $6\frac{1}{2} \times 6\frac{1}{2}$ in.; braces 3×4 in.; rafters 2×6 in. and nail girts 4×4 in.

After the material was hauled to the locality selected for building, the work of framing began. The man who did the "laying off" would proceed to take a stick of timber out of wind; he would determine which face of the stick he desired for the work side and then with that side up, with the adze and jack plane he would dress a spot across it near one end and hang a square across it; then going to the other end he would lay another square across and by sighting across the two squares he would find how to dress that end in order to bring the two squares perfectly parallel with each other. By trying the square at each of these points he would dress a second side until the stick was perfectly square at each end on both sides, then by marking on all sides of the stick at these points he determined where to strike his lines to which to work. If it were $8\frac{1}{2} \times 8\frac{1}{2}$ in. he would have a line 2 in. from the work face each way, a boxing line 8 in. from the work face and after lining he would proceed to lay off his mortises, tenons, boxing, splices, etc.

In laying off he used the lines by which to square all the work, never using the face of the timber for that purpose. After he had a stick laid off he turned it over to one of the men who would bore and mortise it, box and dress the tenons, draw-bore it and then finish by counter-hewing the face or work side so that no bumps would interfere with putting on the siding.

Thus we proceeded day by day until we had the framing near enough finished to set a day for the "raising," and this was a big affair.

We will suppose the barn to be $40 \times 60 \times 18$ ft. with basement. The basement is made in the hillside with a southern exposure if possible. It is enclosed on the north side and both ends by a stone wall 5 ft. high, while the south side wall is just high enough to maintain the timber a sufficient distance from the ground to keep it dry. The center is supported on posts set on stone pillars. A frame 4 ft. in height on top of this 5 ft. wall gives us a basement 9 ft. high with ample space for windows and doors for light, ventilation, etc.

We were provided with a number of pike poles of various lengths, ranging from 10 ft. to 25 ft. These were of light wood having a sharp pike in the small end and one or two pins through the butt end.

It was considered that 40 men were sufficient to erect a frame like this, but generally twice that number of men were invited.

Let me here say that the joists for floors were generally furnished from the old log barn which had outlived its usefulness, these being cut to proper length.

We will now proceed to raise the frame. One of the carpenters will select the timbers which are carried by the men to the proper place, where they are fitted to others until a "bent" is formed, and then the carpenter who is in charge of that part of the work gives the command and the bent is set up in position.

Suppose we have the basement frame completed we are now ready for the main structure. Having the joists all in position we lay a loose floor over the whole structure, taking care not to cover any mortises where the posts and braces are to go.

Next are the timbers. A beam 40 ft. long is brought in and laid at the proper distance from one end of the building; next come the posts; then the stringers and braces. These are put in place and pinned and then all is ready to set it up. A man is placed at the foot of each post with a crow bar to keep the post from slipping, while the others form a line along the beam at the top end of the bent, and still others stand behind them with pikes. The command is given and the mass of timber begins to rise; pikes are placed and as the bent swings upward the men one by one drop back to the pike poles and carefully push it into position, while a few men on the ground at the end of the building with long pikes keep the bent from toppling outward.

We now are ready for the next bent and if it is an 18 ft. story it will be a little more difficult to raise it. We are building a five-bent barn and of course we have only a space of about 15 ft. in which to lay the timbers while we put the bent together. It faces toward the driveway, hence we must put it together face-up. As we raise it we have at the same time to draw it back until the foot of each post comes into position to enter the mortise in the sills. Then the crow bar is brought into play again and the work goes on until all are in position. Meanwhile the side center posts and stringers are put in place.

Next are the wall plates and the purlins. The timbers are all hoisted across the beams near the top and the wall plates are then lifted up and dropped into position. The purlins are put together in a bent and raised in the same manner as before described.

The length of time consumed in raising a frame like this depends largely upon the kind of men in charge. If the work has been properly executed and an efficient man is in charge on raising day, everything jogs along smoothly and early in the afternoon all is completed. If, however, the framing has been done by an incompetent, the men will work hard all day and then perhaps not get it finished. A gang of men will become disgusted if they have to stop every little while and wait until some one corrects a mistake that has been made.

In conclusion I will say that this is not as clear as it would be if accompanied by photographs and drawings and will perhaps be not so clear to the younger class of carpenters as it should be, yet I feel it will remind some of the older readers of past experience in the same line. Now, if the old framers do not criticize me too hard this time I will perhaps in the near future air my notions on plank frame barns.

Design Wanted for Two-Family House

From W. H. N., Cambridge, Mass.—Will some of the many readers of the Correspondence columns of *The Building Age* furnish a plan of a good-looking two-family house to be erected on a corner lot 60 ft. on one street and 90 ft. on the other. I want separate entrances from each street; four rooms down stairs and four rooms upstairs for each suite with, of course, all the modern improvements. Any suggestions which the readers may furnish will be appreciated.

Plans for an Octagon Barn

From D. P. Barry, Redford, N. Y.—In the letter of "J. G.," Kenton, Tenn., published on page 29 of the January issue, the request is made for plans and specifications for an octagonal barn of not less than 60 ft. nor more than 72 ft. in diameter. As he seems con-

cerned only about his corn crib and hay loft, but says nothing about the capacity of either, I can only offer a few suggestions to help him out.

In an octagonal barn of 60 ft. diameter the sides would be just under 24 ft. and for a diameter of 72 ft. the sides would be 27.55 ft. Either of these sides is too long to be good looking or stable. In fact, the sides would be weak and the roof very unsafe. I have therefore drawn the plans for a hecdecagonal or 16-sided barn, the sides being 14 ft. for a diameter of 72 ft. and 12.87 ft. for a diameter of 66 ft. Either of these dimensions will give short girts and a very firm roof.

The entire floor should be concreted and 4 in. higher in the center than at the outer edges. The outside posts should be 8 x 10 in. and 18 ft. to 20 ft. high, as the owner may desire. The angle may be formed by sawing or furring. The plates and girders are 8 x 10 in., the sills may be 6 x 10 in., the inside posts 8 x 8 in. and

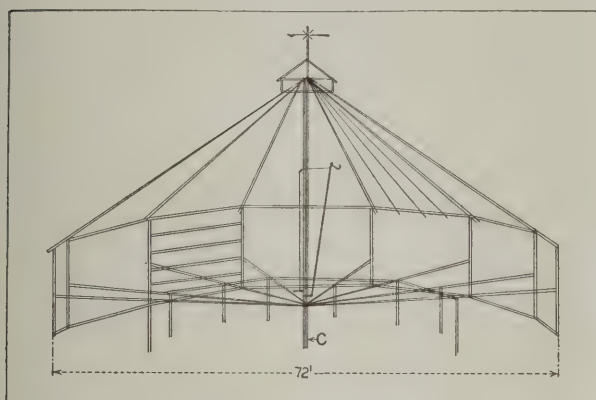
as the owner may wish to clapboard or not. The joists may be put in to floor all one way.

The 16 angle rafters should run to the center, the others to headers 8 ft. from the center. The cupola may be octagonal and quite low arranged for light and ventilation.

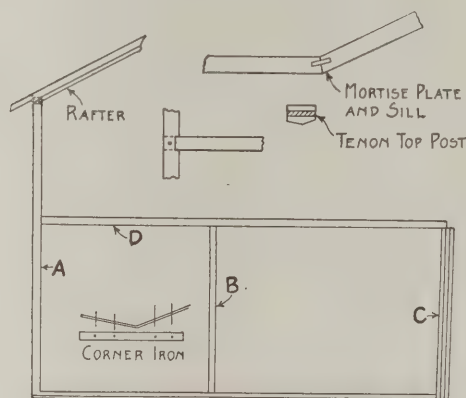
If for shingles the pitch of the roof should be at least $\frac{1}{3}$; if for metal $\frac{1}{4}$ will do. The girders should be 12 ft. above the floor for convenience in driving loads into the barn. A corn crib is built around the center post.

The driveway may go clear through or around the center. A line of stalls is shown on the drawings, but the owner will arrange the lower floor to suit his needs.

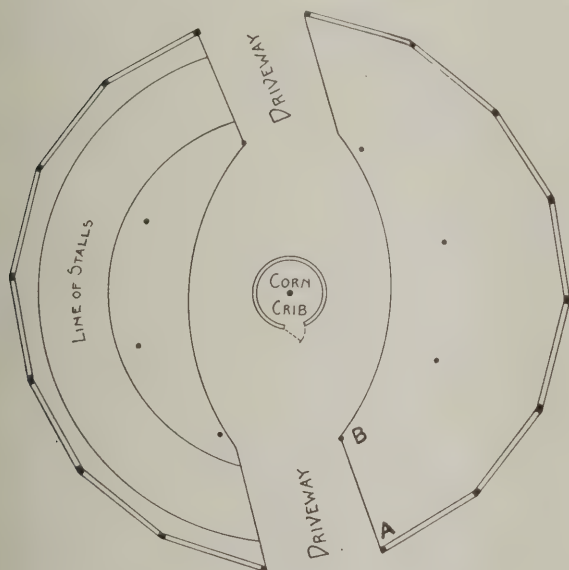
Hay openings are indicated in the loft floor over the driveway and it may be necessary to place them nearer the center. A hay track will be almost impossible without gables and almost useless with gables, therefore I



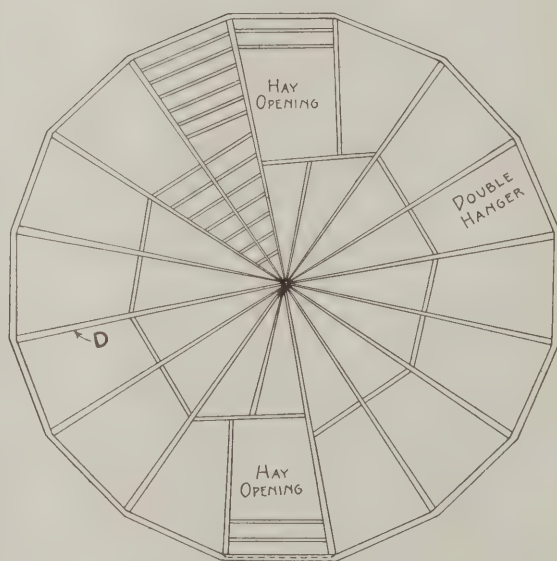
Partial View of Frame Work of Barn Showing Center Post with Derrick and Crane



Various Details of Construction



Plan of Barn Showing Driveway and Position of Corn Crib and Stalls



Plan of Loft Floor Showing Hay Openings

Plans for an Octagon Barn—Contributed by D. P. Barry, Redford, N. Y.

the center post 15 in. in diameter and capped with an iron plate $\frac{1}{2}$ in. thick and 2 ft. in diameter and bolted to the under side of the eight girders reaching to the center. Draw an eight-pointed star on the plate and drill $\frac{3}{4}$ in. holes in the points. The other eight girders go to the headers about $\frac{4}{9}$ of the distance to the center. The headers are carried by hangers and should be 6 x 10 in. From the headers to the center may be 2 x 8's or these may be left out and filled as shown.

On each outside angle is a plate $\frac{1}{2}$ x 2 x 12 in. bedded flush and bolted on the upper outside edge of the plates. The girts may be horizontal or vertical,

have drawn a center post from the loft floor to the cupola for a derrick and a crane. The movable arm should be long enough to reach the center of the hay opening drawn up with a windlass and pulley in the center of the post. This will drop the hay in all parts of the loft and do it quickly. A hardwood box should be fastened at the cupola and floor for the derrick to turn in and if oiled will be easily turned with arms at the bottom.

The tenons on the outside ends of the girders should be housed $1\frac{3}{4}$ in. thick and there should be two of them. The outside shoulders should be $1\frac{1}{2}$ in.

The rafters should be crowned 2 in. in the center before boarding and ripped from 3 x 12 in. stuff diagonally every 4½ in. at one end to 7½ in. at the other, and need not be backed. The rafters should be supported while the roof is going on. The boards should be well nailed, after which it will be self-supporting. All planed lumber should have the smooth side turned in. The crane must be arranged so it will rise up and down under the rafters. There will be no need for bracing.

The doors at the driveway may swing in or out and all other doors and windows arranged to suit owners' requirements. All timber should be dressed and all lumber planed and matched if owner can afford it.

Piping Water from Spring to Barn

From C. S. P., Wilmington, Del.—I have a spring located 1700 ft. from the barn and at a height of 3 ft. above the watering trough at the barn. I would like to pipe the water to the barn in order to water 50 cows and to cool the milk. The pipe will be straight to the barn, where it will have about three 90 degree ells. About 1000 ft. of the pipe will be laid 12 in. deep in the mud bottom of a small stream of water.

What temperature will be lost on hot days in this spring water, and what size of galvanized pipe will be required to give a satisfactory flow? The flow of the spring will now fill a 1½-in. pipe.

Draining a Cellar

From O. W., Marion, Ind.—I am intending to dig a cellar under my kitchen and as I will be compelled to go quite a distance for an outlet if I drain by digging a ditch and tiling it, I would like to know if there is any other way than this to put in a successful drain. The lot is rather high and of a hard clay soil with plenty of natural fall for surface drainage.

Some Questions in Stucco Work

From B. H. F., Florida, Ala.—I would like to get some information on stucco work and come to the Correspondence columns in the hope that some of the practical readers will give me the benefit of their experience. Stucco work is not much used in the South on account of low price of lumber. I can get men to do the work, but they do not know the cost.

I want to know the amount of cement and sand used to cover one yard, also the cost of steel lath, as I suppose that is the kind used for stucco work.

We pay here \$22 per M for siding and 40 cents per square to put it on. We pay \$1.80 for paint and 50 cents per square to put it on. Usually we put on two coats, which takes one gallon to two squares. We have common plastering done inside with the white finish at a cost for labor of 12½ cents per yard. Any information as to the stucco work will be greatly appreciated.

Note.—It is probable that our correspondent will find much information on the subject that is of value to him in the article by Mr. McCullough which appeared in the issue for February of the current year.

Truss for a Wagon Shed

From C. C. H., Brookville, Pa.—I would like very much to hear from some of our brother chips as to which is the best method of building a simple truss for a wagon shed of 40 ft. span, the truss to be of 2 in. stuff and iron rods. The rise per foot of the truss

will be 6 in. or possibly 7 in. The roof will probably be covered with slate.

I would like the brothers who are willing to give their ideas on the subject to furnish a design of truss with the sizes of the different parts indicated, also the size of the iron rods and their location.

I know that there are trusses illustrated in back numbers of *The Building Age*—or as it was then known *Carpentry and Building*—but as the world goes on and new subscribers are constantly coming forward with new ideas regarding all kinds of framing, so possibly some one can show us something different in the line of trusses than what has already appeared.

Cause of Discoloration of Plaster

From J. L. H., Warwick, N. Y.—Can any of the practical readers of the paper tell me the cause of yellow spots showing in a newly plastered wall? We have had it happen on a number of jobs lately. We use a patent plaster for the scratch and brown coats and finish with a lime putty and plaster of paris. It spoils what would be a good looking job.

Best Method of Laying Red Cedar Shingles

From D. P. B., Redford, N. Y.—The best way to lay red cedar shingles is to dip them in hot tar, creosote paint, creosote stain or crude petroleum. Let them dry, then lay them and give them a coat of the same material afterward. This suggestion may be of use to "Country Carpenter" whose letter appears on page 145 of the March issue.

What Readers Say of "The Building Age"

From F. S., Washington, Ind.—I wish to add my testimony in appreciation of the paper by stating that I have been a reader of it off and on since February, 1892, and think a great deal of it.

I can say that the paper at present is much the best of its kind published in the country at anything like the price. I wish it every success.

From John L. Shawver, Bellefontaine, Ohio.—In some of the issues of the paper not long since many of the readers appeared to be vying with each other as to evidence of the oldest subscriber. Circumstances I think have much to do with that, but let us see who has paid for the paper the most years in advance. I am paid up to December, 1921. It saves clerical expense to pay several years in advance. Each volume is bound and all are carefully preserved on a special shelf in our office and frequently consulted.

While the old name *Carpentry and Building* had become endeared to me, yet I like the new name and believe that *The Building Age* is more appropriate to this generation. I gladly testify to the improvement in the magazine.

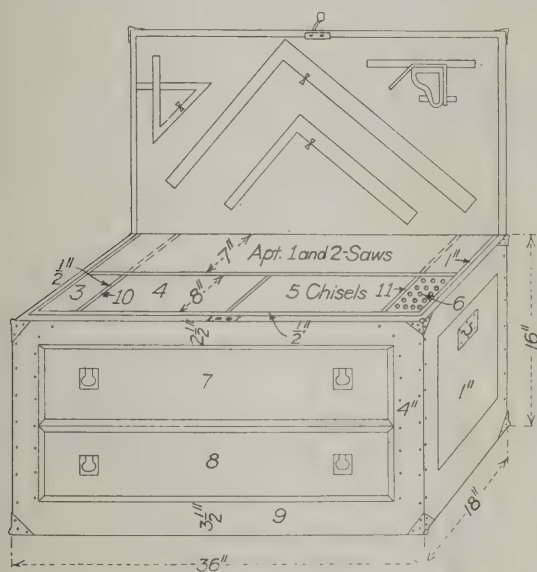
From C. N. S., Manchester, Mo.—I have been a reader of *The Building Age* for the past 10 years and would not be without it. My father was a subscriber to the paper when it was first published and known as *Carpentry and Building*. In looking over some of the late numbers I saw copies dated as far back as 30 years ago.

I consider it one of the most valuable papers published and I hope you will give this letter a place in the Correspondence columns so as to permit other readers to know just how valuable it is to a subscriber. I am sure no builder will make a mistake by subscribing to it, as he will get full value for his dollar every month of the year.

Construction of Tool Chest

From L. F., West Texas.—I am sending a rough sketch of a tool chest I have been using for some time and find it very desirable for any work where a full set of tools is necessary in compact form and yet readily accessible. The chest is of such a nature that all parts of it can be reached without difficulty. I consider it an unusually small chest yet it will contain \$200 worth of good tools, and with one exception every tool is accessible without moving any other tool from its position; hence I am offering the sketch to "F. S.," Grand Rapids, for the possible interest that it may have for him.

The outside dimensions are 36 x 16 x 18 in. This will be found large enough for most any kit of tools required at the present time. Compartments Nos. 1 and 2 are 7 in. wide and 7 in. or 8 in. deep, according to the width of saws used by the carpenter. At a distance 7 or 8 in. down from the top of the back edge of trays



Construction of Tool Chest—Submitted by "L. F."

Nos. 4 and 5, the 1 in. board shown at Nos. 10 and 11 which continues across should be cut out on plumb line with back of trays Nos. 4 and 5, which is also the back line of the drawers. Use a thin, say $\frac{1}{4}$ -in. board 1 in. wide, for the bottom of the saw rack, which slips down and rests on the remaining portions of Nos. 10 and 11. I would state that compartment No. 2, which is immediately under No. 1, will be large enough to receive a Stanley Beading and Matching plane No. 45 in its original box and the remaining space will receive a Stanley Improved Miter Box K.D.

In compartment No. 3 can be placed two hammers, one shingling hatchet and one hand axe.

Nos. 4 and 5 are $\frac{1}{4}$ -in. deep; No. 6 should have a bottom on a line with the bottom of Nos. 4 and 5 which should be bored full of holes to suit bits of various size. No. 7 should be about 4 in. deep to receive small boxes used for packing small tools, gauges, drills, oil-stones, scrub plane, veneer scraper, hand scraper, routers, tape lines, etc., etc.

No. 8 should be $3\frac{3}{4}$ or 4 in. deep, 8 in. back to receive a jointer, a jack, a smooth and a block plane. The 2 in. left along the back of the drawer can be used for iron level in wood case or wood level.

No. 9 or 2 in. space between the bottom of the chest and the bottom of the drawer is to receive tin snips, bars and other articles.

Nos. 10 and 11 are of $\frac{1}{2}$ -in. stuff running full width of the chest just at the ends of the drawers to which the runs are screwed. Just back of the drawers are cut out to receive and form rests for the saw rack,

the spaces formed by Nos. 10 and 11 and the end panels are utilized as per Nos. 3 and 6. I would state that No. 6 should have a stop board down 7 in. or 8 in. below the holes to stop the bits, which are inserted shank first.

Screw to come about even with top of No. 11, which is $1\frac{1}{4}$ -in. above the bottom of the tray. All squares are gained into the lid to come flush.

The corners are ironed with 5-in. strap hinges. Outside of chest case work is made of maple flooring glued and fastened with round headed screws.

It may be advisable to sort out one's tools and place them in the order and class in which they are likely to be used. Lay them as close together as possible, then take the measurements and make the compartments of the chest to suit. As a rule two sets of tools are never alike. It will be surprising how small a space a kit of tools will occupy if properly placed together, hence I offer the plan of my chest to any one who may find in this any helpful suggestions.

The back panels are of $\frac{1}{2}$ -in. sugar pine; the end panels are 1 in. full size as the end of the chest. The top and bottom are each made of a single piece of 1 x 18-in. stuff. The top is covered with tin secured by $\frac{5}{8}$ x 4-in. round headed brass screws.

The drawer rails should come flush with the outside of the case work. The bodies of the drawers are of $\frac{1}{2}$ -in. sugar pine; the bottoms $\frac{1}{4}$ -in. white pine or sugar pine. The end panels are 1 in. to receive mortise handles. The drawer pulls are small mortise style and of brass. If the chest is to be shipped it would be best to mortise the finger receives into the drawer fronts, not clear through, as the other style gets crushed when shipping the chest about from place to place.

Framing a Tower

From D. P. B., Redford, N. Y.—I would say to "J. F. M.," Los Angeles, Cal., who asks in the March number how to get the cuts for the posts in building a tower 30 ft. square, that he can get his posts at 10 and 20 on the square—10 for the horizontal and 20 for the vertical. Cut the top horizontal—cut the same as the bottom. Experiment on pieces of 2 x 2-in. stuff before cutting the posts.

Hanging Three-Butt Doors

From P. M. H., Sedalia, Mo.—For the benefit of "C. R.," Appleton, Wis., I would say that the rule for hanging doors is to place the top hinge 7 in. down from the top and the bottom hinge $10\frac{1}{2}$ in. up from the bottom. The third hinge is placed in the center of the door measuring from top to bottom. The knob is placed 35 in. above the floor.

Finishing Window Frames of Oregon Fir

From D. P. B., Redford, N. Y.—In my opinion "F. H. S.," Athol, Mass., should have a power drum-sander to smooth up any double-grained stuff. A steel hand-scraper will do the business but it is slower. Broken window glass will answer for a small job.

Preventing Plaster from Cracking

From E. G. H., Atchison, Kan.—I would like to ask "J. A. S.," Cleveland, Ohio, for his method of keeping plaster from cracking at the joints of the 2 in. pulp block and 2 x 4 in. studding as shown on page 482 of the issue of *The Building Age* for September, 1912.

ESTABLISHED 1879

THE BUILDING AGE

Formerly CARPENTRY AND BUILDING
Copyright, 1913, by David Williams Co.

Entered at New York Post Office as Second Class Mail Matter

Published Monthly by the

David Williams Company
239 West 39th Street New York

W. H. Taylor *President and Treasurer*
Chas. G. Phillips *Vice-President*
Fritz J. Frank *Secretary*
M. C. Robbins *General Manager*

Henry Colwell, *Editor*

J. B. Bennett, *Business Manager*

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Subscription Rates: To all parts United States and Mexico, \$1.00 a year; to Canada, \$1.25 a year; to all other countries, \$2 a year.

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Control of Building Operations

Apropos of the comments presented in our last issue relative to the bill recently introduced in the New York state legislature looking to the licensing of builders desirous of operating within the borders of the state, it is interesting to note an ordinance concerning the "control of building operations" which was recently passed by the city council of Boston under authorization of the Act of the Legislature of last year. The main points of the ordinance are that a board of examiners, three in number, is to be appointed by the mayor under the provisions of the charter and within 30 days of the organization of the board the first examination is to be held of applicants desiring to be registered as qualified to have charge or control of the construction, alteration, removal or tearing down of buildings or other structures. The board establishes various classes of persons, presumably according to the character of the work to be superintended, and the qualification for each class. When an applicant passes the examination he is to be duly certified by the board and licensed by the Building Commissioner. Those who show the board that they have had charge of work prior to the passage of the ordinance and are properly qualified may without other examination be registered, certified and duly licensed in their respective class. Another feature which cannot be too strongly emphasized is that permits for constructing, altering, removing or tearing down buildings are not to be issued unless the application contains the name of a person duly licensed to take personal charge or control of the work. This provision it will be seen tends to overcome some of the objections which were noted in our last issue in regard to the proposed legislation for New York City in connection with the licensing of builders. In properly and effectively administering the provisions of the Boston ordinance, however, more or less uncertainty has developed in regard to the provisions and the mayor of the city has asked the Master Builders' Association of Boston to appoint a committee to take up the matter with the Board of Examiners and endeavor to assist them in arriving at a conclusion as to what should be done regarding the licensing under the ordinance.

Eliminating Ambiguity from Contracts

A movement has been started for the elimination from plans, specifications and contracts, of the indefiniteness and ambiguity which lead to increased expense to building contractors and owners. It is proposed that there shall be an accurate definition and standardization wherever practicable of plans and specifications in order to eliminate unnecessary hazard and uncertainty, to reduce the cost of improvements to the owner, to give the contractors and the surety companies a proper understanding of the obligations they assume, to establish contracting and suretyship on a more definite and stable basis and to provide for the settlement of all differences by some equitable constituted authority. The entire matter was presented in an exhaustive and comprehensive manner to the members of the Builders' Exchange of Louisville in t

early part of March and a series of resolutions were adopted. One of the resolutions recommended that the surety companies of the United States establish a Joint Bureau of Inspection to pass upon plans and specifications for work to be let and for which surety company bonds are required, the bureau to be maintained in all states or divided up in such way as to cover the entire United States in the least expensive manner. The object is that the men comprising this bureau shall carefully investigate the provisions of all plans and specifications with a view to making recommendations to make them explicit and to remove the risk to contractors and surety companies and to provide for the adjustment of differences between architects, engineers, contractors and owners. The matter was later brought to the attention of the Kentucky Association of Surety Agents with the unanimous approval of the movement to standardize construction plans, specifications and contracts, with the further recommendation that the matter be brought to the attention of surety companies doing a national business in order that the reforms sought might receive wide attention and aid in the removal of the injustices of the present practice.

Disposal of Stone from Mammoth Excavations

Curiosity has often been aroused on the part of those who have given the matter the slightest thought as to what becomes of all the stone and dirt taken from the excavations of mammoth structures erected in New York City, as, for example, the New York Central Terminal, the McAlpin Hotel, not to mention the extensive subway excavations in progress in various sections of the city. The answer is found in part at least in the new sea wall on the ocean front at Manhattan Beach, which when completed will extend a distance of about $2\frac{1}{2}$ miles and prevent the customary winter inroads of the ocean at that point. It will be recalled that the famous hotel here has been razed and the property laid out in building sites for all-the-year-round dwellers as well as those who desire to occupy a cottage by the sea during the torrid months of the summer. The last stone of the first section of the sea wall, some 3500 ft. in length, was put in place the third week in March, work on the section having been started on May 1, 1911. The wall is 50 ft. in width at its base and 8 ft. in width at the top. In its construction over 150,000 tons of rock have been used, some pieces weighing all the way from 7 to 10 tons.

Relative Costs of Heating and Ventilation

Too frequently ventilation is looked upon as a luxury and little effort is made to investigate it. A building may be heated without any provision for ventilation, but, fortunately, building construction and materials have such porosity that close observers have reached the conclusion that in such cases there will be sufficient leakage of air to provide at least one change of air per hour. If the heating is done by stoves, heaters or radiators placed within the room, only sufficient heat is necessary to replace the heat lost by this one change of air through walls and windows. If, on the other hand, the building is indirectly heated by a heater in

the basement, a larger amount of heat will be necessary and the amount will be in proportion to the number of times the air in the building is changed. The loss of heat through the walls and windows must be provided for, and it is a common conclusion among those who are expert both in making observations and calculations, that the amount of fuel required to make up for the heat losses through glass and walls must be multiplied by 2, $2\frac{1}{2}$ or 3 to provide a comfortable temperature in the apartment when it is properly ventilated. This is why some men install larger heaters than others and why the systems installed by some contractors fail when extreme weather occurs. This is particularly true in reference to all kinds of indirect heating systems. A more careful study of this question by all who are engaged in this field should have a beneficial effect on the character and capacity of heaters installed. It also indicates the need of such educational work as will reach those who are less inclined to take up the necessary study to become acquainted with the facts in the case.

Architects of the Albany Court House

In the competition for the new county court house to be erected in Albany at an estimated cost of about \$672,000, Hoppin & Koen of 244 Fifth Avenue, New York City, were selected as architects for the building. The second prize of \$500 went to Griffin & Wynkoop, 30 Church Street, New York City; the third prize of \$300 went to Hewitt & Bottomley, 527 Fifth Avenue, New York City, and the fourth prize of \$200 went to Albrow & Lindeberg, 2 West Forty-seventh Street, New York.

Proposed Law for Licensing Architects

There has recently been drafted an act to amend the general business law in relation to the practice of architecture in the state of New York, the draft of the proposed law for the registration of architects having been approved by the Board of Regents of the University of the State of New York and endorsed by the several New York State Chapters of the American Institute of Architects, as well as by the New York Society of Architects.

It is provided that the regents of the University shall appoint a board of five examiners who shall make rules for the examination and registration of candidates who desire to qualify as practicing architects subject to the approval of the Board of Regents. The board of examiners shall be composed of architects who have been in active practice in the state of New York for at least ten years previous to appointment.

Any citizen of the United States or any person who has duly declared his intention of becoming such citizen—being at least 21 years of age and of good moral character—may apply for examination or certificate of registration, but before securing such certificate shall furnish evidence of having satisfactorily completed the course in an approved high school or the equivalent thereof, and subsequent thereto of having satisfactorily completed such courses as are included in the first two years, in an approved institution conferring the degree of bachelor of arts. The candidate shall also submit satisfactory evidence of at least five years' practical experience in the office or offices of a reputable architect or architects, commencing after the completion of the high school course. The board of exam-

iners may accept satisfactory diplomas or certificates from approved institutions covering the course required for examination. The board of examiners in lieu of all examinations may accept satisfactory evidence of any one of the qualifications set forth under subdivisions of the section amended by the act in question.

Every person securing a certificate of registration shall file it with the county clerk of the county in which he resides or maintains a place of business. Any violation of the provisions of the act shall be a misdemeanor.

Limits of Building Hights in Various Cities

In view of the agitation of the question of limiting the hight of buildings in New York City it is interesting to note the places where under municipal or state laws a limit has been placed on the hight to which buildings may be erected. These arranged in alphabetical order are as follows:

BALTIMORE—Fireproof buildings limited to 175 ft. and non-fireproof buildings to 85 ft.

BOSTON—Two and one-half times the width of the street, the maximum being 125 ft.

BUFFALO—No hight greater than four times the average of least horizontal dimension of the building.

CHICAGO—An absolute limit of 200 ft.

CLEVELAND—Two and one-half times the width of street with maximum of 200 ft. Recesses or set-backs to be counted as added to the width of the street.

DENVER, COLO.—Not to exceed 12 stories and those more than 125 ft. to be fireproof.

JERSEY CITY, N. J.—No building or structure except a church spire shall exceed in hight $2\frac{1}{2}$ times the width of the widest street upon which it stands.

LOS ANGELES, CAL.—A limit of 150 ft.

NEWARK, N. J.—Not to exceed 200 ft., but warehouses and stores shall not exceed 150 ft.

NEW ORLEANS, LA.—The hight at the street line shall not exceed $2\frac{1}{2}$ times the width of the widest street which the building faces. Set-backs are to be counted as added to the width of the street.

PATERSON, N. J.—Warehouses and stores must not exceed 100 ft. in hight.

PORTLAND, ORE.—All buildings except churches are limited to 150 ft.

SCRANTON, PA.—The limit is placed at 125 ft.

ST. LOUIS, Mo.—On streets less than 60 ft. the limit is $2\frac{1}{2}$ times the width.

Officers of Brick Manufacturers' Association

At the twenty-seventh annual convention of the National Brick Manufacturers' Association held in Chicago at the time of the Clay Products Exhibition, officers for the ensuing year were elected as follows:

President, W. H. H. Rogers, Rochester, N. Y.

First Vice-Pres., Eben Rogers, Alton, Ill.

Second Vice-Pres., C. P. Mayer, Bridgeville, Pa.

Third Vice-Pres., C. J. Deckman, Cleveland, Ohio.

Treasurer, John W. Sibley, Birmingham, Ala.

Sec., T. A. Randall, Indianapolis, Ind.

Assist Sec., A. M. Wallace, Indianapolis, Ind.

In this connection it is interesting to state that Secretary Randall was re-elected to the office of secretary for the twenty-seventh time.

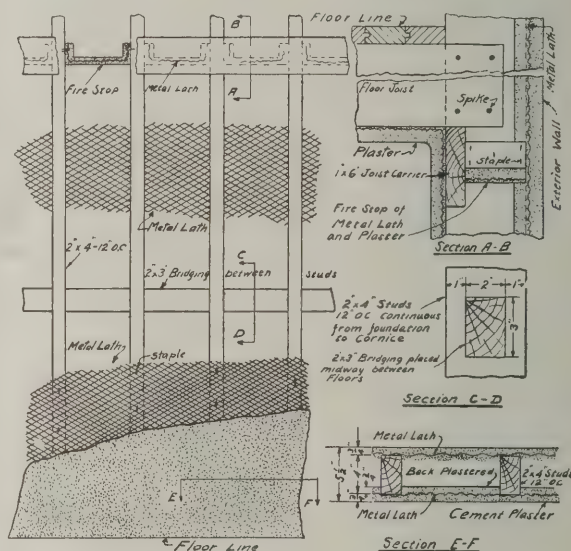
The Workmen's Compensation Act of New Jersey has been held to be constitutional by the Supreme Court of that state.

Fire Stops in Stucco Wall Construction

In the well constructed dwelling everything conducive to the comfort and safety of the occupants should be included, but a feature that is not always given the consideration which its importance deserves is the fire stop. This, when properly arranged, is not only a means for retarding the spread of fire from one story to another, but it also tends to prevent rats and mice from the cellar entering the vertical walls of the house as well as getting between the various floors and ceilings.

Modern fire preventive methods should prompt one to make provision for fire stops in the walls between the different stories, particularly if wood lath is used on the inside of the wall. This is often accomplished at the first floor by bricking up the space between studs from the top of the foundation walls.

Another method which might be suggested is that shown in the accompanying illustration which represents the arrangement of a fire stop in a wall of stucco construction and which is being promulgated by the



Fire Stops in Stucco Wall Construction

Associated Metal Lath Manufacturers, Youngstown, Ohio. The details show so clearly the scheme that is followed in connection with a building of this character that extended comment is unnecessary.

Officers of Alberta Association of Builders' Exchanges

At the third annual convention of the Alberta Association of Builders' Exchanges held at Edmonton the following officers were elected for the ensuing year: President, J. H. Miller; first vice-president, Thomas H. Miller; second vice-president, A. M. Frith; treasurer, E. H. C. Walker, and secretary, A. O. Wetmore.

Henry W. Desmond, formerly vice president and general manager of the Record and Guide Company, publishers of *Real Estate Record and Builders' Guide*, and one of the founders of the *Architectural Record* and of Sweet's Catalogue of Building Construction, died at his home in Cranford, N. J., March 18, at the age of 50 years.

The United States Supreme Court has declared the Richmond, Va., building line ordinance invalid.

CONSTRUCTION OF A TEMPORARY COMFORT STATION

Conveniences Provided by Temporary Structures for One Hundred Thousand Visitors During a Recent Celebration in Wilmington, Del.

CELEBRATIONS of many kinds which are constantly occurring in various sections of the country render it necessary to provide for the accommodation of the many thousands of visitors on those occasions, public sanitary conveniences in which builders as well as plumbers are interested, more especially as the structures are usually of a temporary nature. At an "Old Home Week" celebration occurring some months ago in Wilmington, Del., two public comfort stations, of which a plan and elevation are presented herewith, were erected in parts of the city likely to be most accessible and useful to the "Home Comers," these temporary structures being provided through the recommendation to the city of Plumbing Inspector E. P. McKay.

It appears that the city of Wilmington delegated Mr. McKay to attend various meetings of the American Society of Plumbing Inspectors and Sanitary Engineers where he had the opportunity of discussing with other members of the society the temporary buildings which had been used in various cities under similar circumstances. He also became familiar with the Society's Comfort Station mark, which consists of a green band 1 in. wide and 5 in. in diameter, in the center of which is a four-pointed orange-colored star. He not only made use of this mark on the comfort stations

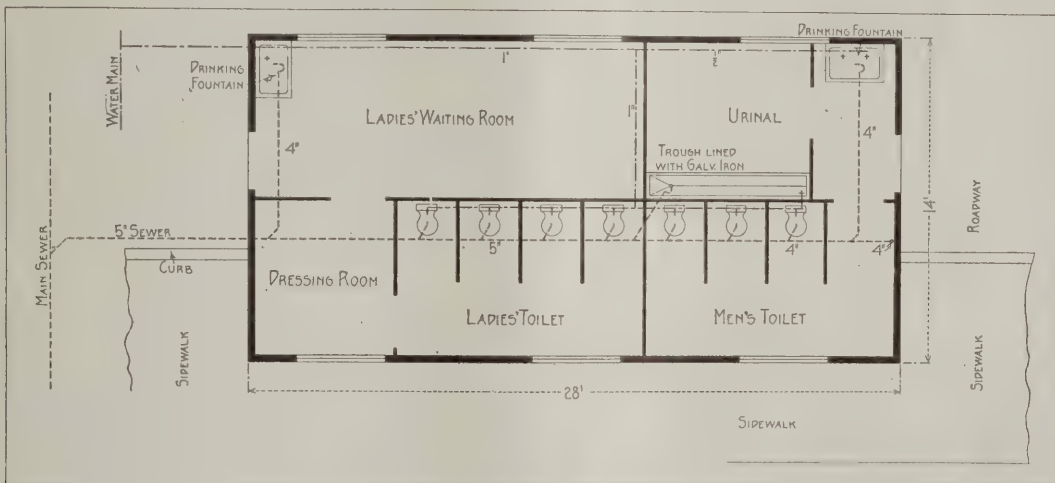
The sills under the joist outside the curb line consisted of two 3 x 8 spiked together and placed 4 ft. on centers. The floor consisted of No. 2 boards faced on one side.

A partition 11 ft. from one end extended to the roof. There were no doors on the interior and the windows were of the batten type hinged at the top and opened out, being fastened up with rods hooked at the bottom. All inside and outside woodwork was treated to two coats of paint.

The frame of the building was erected in sections



End Elevation—Scale $\frac{1}{8}$ in. to the foot



Plan of Comfort Station Showing Arrangement of Rooms and Position of Plumbing Fixtures—Scale $\frac{1}{8}$ in. to the foot

which he erected, but also induced many of the merchants of the city to use a similar mark on the show windows of premises where sanitary conveniences were available for visitors.

As will be seen from the plan given herewith the temporary buildings were 28 ft. long and 14 ft. wide, located partly on the sidewalk and partly in the roadway. They were constructed 10 ft. 9 in. high on the sidewalk side and 8 ft. 9 in. on the roadway side, so that the roof pitched one way. The joists were 2 x 8 in. placed 24 in. on centers, the studs were 2 x 3 in. dressed, the rafters were 2 x 8 in. dressed and placed 3 ft. on centers and the plate consisted of two pieces of 2 x 3-in. stuff securely spiked together. The nailing ledges were 2 x 3 and cut in between the studs. The siding and roof covering consisted of No. 2 boards double faced and joints were covered with 2-in. strips. The roofing boards were well covered with slaters felt.

and numbered so that it could be readily taken down and stored for future use and erection.

On one side of the partition the space which was devoted to the use of men was further divided into three compartment. In one there was installed three water closets and in another a wooden trough urinal lined with galvanized iron.

In the entrance vestibule there was a sink for the double purpose of affording opportunity for washing and also take care of the waste from a bubbling drinking fountain.

On the other side of the partition, in a space 14 x 17 ft., was a ladies' waiting room, a dressing room and another room in which were installed four water closets. These were separated by partitions 6 ft. 6 in. high.

In the corner of the ladies' waiting room at the entrance was installed a sink with two faucets, one for

washing and the other to carry the waste from a bubbling drinking fountain.

From the plan it will be seen that a 5-in. terra cotta sewer pipe was connected with the main sewer, and was carried along under the floor of the station in front of the water closets. The terra cotta pipe was used as the construction was temporary and it would cost less and be entirely satisfactory.

The Vogel hopper closets were connected by means of 4-in. Y branches, and there were 4-in. branches to receive the waste from the two wash sinks, the drinking fountains and the trough urinal. After it received the connections from the closets in the apartment for men the 5-in. terra cotta drain was reduced to 4 in. to receive the branch from the sink and then the 4-in. line ran to the end of the station and was carried up through the roof. A 1¼-in. lead waste connected the sinks and urinals with the terra cotta sewer line.

A 1-in. water connection was made with the street main and was carried on the floor of the station to the end of the ladies' room, where a ½-in. branch was carried to the sink in the men's apartment to supply a ½-in. hose bibb and the drinking fountain. A 1-in. branch was carried over to the water closets and was branched each way to supply the flushing tanks. At one end a branch supplied a ½-in. plain bibb used for flushing the urinal trough.

The sink in the ladies' waiting room was supplied with a ½-in. branch for the drinking fountain and the ½-in. hose bibb. The caretakers were supplied with hose to facilitate their work in keeping the stations clean.

The public spirit of the plumbing trade in the city is reflected in the manner in which the fixtures and their installation were provided. The Joseph A. Vogel Co. donated 14 No. 5 short trap factory hopper water closets with supply tanks. The Delaware Electric Supply Co., the Speakman Supply & Pipe Co., the Gawthrop & Brothers Co. and George P. Hutton provided various parts of the fixtures and equipment. The Water Department and its plumbers installed the work, and the men from the Street and Sewer Department made the connections to the main sewer.

Notwithstanding that this equipment was used by people who were strangers to it, and was in continuous use, no trouble was experienced, except that one closet was stopped by the use of material in it for which it was not intended. In some measure this satisfactory operation of the equipment is due to the fact that a woman was in charge of the women's toilet room and a man in charge of the men's room.

Highest Apartment in New York City

The latest development in apartment house construction is the 18-story building about being erected at the corner of Park Avenue and 66th Street, New York City, and estimated to cost about \$1,500,000. It will be the tallest apartment house in the city, will have an exterior in the Italian Renaissance style of architecture and each story will be divided to contain 18 rooms and six baths. There will be six family bedrooms, one of which will measure 19 x 20 ft., and there will be six rooms for the servants, so situated that the servants will not be obliged to pass through the living quarters to reach the dining-room or vice versa. All the family rooms will be accessible by way of a separate connecting hall and large foyer.

According to the plans of the architect, J. E. R. Carpenter, the dining-room of a suite will measure 20 x 32 ft., the drawing room 15 x 25 ft. and this is separated from the living room, which is 20 x 25 ft., by a salon 13 x 20 ft., so arranged that the three can read-

ily be made into one room. One other feature of the building will be a gallery or elevator foyer on each floor, 15 x 47 ft., which will open on all the living rooms, making it a part of and as useful as any other section of the apartment.

Builders' Wages in Saskatchewan

The following is the new minimum wage scale per hour for mechanics in various branches of the building trades in Saskatchewan:

	1913 cents	1912 cents
Bricklayers	70	67½
Stonecutters	70	67½
Masons	65	65
Plasterers	65	60
Electric Workers	50	45
Painters	50	45
Paper hangers	45	40
Carpenters	50	45
Plumbers	45	40
Steamfitters	45	40

A comparison of the figures for the current year with those of 1912 shows advances in all trades except the stone cutters which remains the same as last year.

Skyscraper for "Professional" Offices

One of the most notable structures to be erected on the upper west side in New York City will be the 35-story building, planned for the southeast corner of West End Avenue and Seventy-second Street, and estimated to cost \$1,400,000. According to the architect, Francis H. Kimball, 71 Broadway, the style will be Gothic with exterior walls of white terra cotta. There will be 32 stories for the cornice and then a gable roof, giving a total height equivalent to 35 stories. It is intended principally for the use of physicians, surgeons, dentists, chemists, oculists, architects and other specialists, and will be known as the "Professional" Building. Three stories of the new structure will be underground, the foundation being about 35 ft. deep resting on bed rock. The new building will be the seventh tallest in this city and is expected to be ready for occupancy by the first of April, 1914.

Liability Insurance for Sheet Metal Contractors

The National Association of Sheet Metal Contractors has made arrangements with a New York liability assurance company by which it is enabled to procure for its members reduced rates on liability insurance. Particulars about this have been forwarded to all the membership by the secretary of that association.

Those who are interested and are thinking of becoming members of the association may obtain full particulars of this scheme from headquarters at 261 South Fourth Street, Philadelphia, Pa.

One of the most important operations under way in Birmingham, Ala., is the 25-story structure for the American Trust & Savings Company, bids for which have just been invited. William Leslie Welton is the architect.

The membership committee of the Builders' Exchange of Birmingham has been doing excellent work in increasing the number of members of the organization and in augmenting the interest therein. It is expected that before many months have passed the membership will have doubled and that the institution will come into prominence and be known as a most important factor in the development of the Magic City.

BUILDING MODERN HOMES FOR WORKINGMEN

Good Housing Accommodations for Employees of Industrial Establishments—
How Modern Conveniences Tend to Promote Continuous
Service of Unskilled Labor

WE have at intervals in the past referred to some of the many cases where industrial establishments have provided housing accommodations for their employees, these in some instances taking the form of model villages provided with every convenience in the

better care of the company's property, as by starting up a good natured rivalry between the women members of this foreign colony, results have been obtained in better living conditions that are simply marvelous.

In the pictures which are presented herewith we show the appearance of some of the houses provided by the company for its workmen with ample yards for the children's playground and we also show a typical street with company dwellings.

Another special work recently started has been the beginning of club rooms that are strictly for the use of the foreign workmen. No "red tape" regulations enforced, but simple rules govern the privileges of the club. Only men with membership cards are admitted to the club rooms, unless by special permission. Any one bringing beer or whiskey on the premises or who gambles for money there will have his membership card taken away

from him. Any one refusing to do his share of the work in caring for the club rooms as directed by the club's captain will also forfeit the privileges of the club. While the club is for men, members desirous of using the rooms for any assembly purposes or to occasionally give a party may do so by securing permission from the proper authority.

The secretary of the club is a linguist and in addition to his club duties acts as assistant to the construction department engineer as well as general advisor to the foreign colony. A large number of foreign newspapers



*Building Modern Homes for Workingmen—View Showing Generous Yards
About the Houses*

way of carefully planned houses, well regulated system of sewage disposal, electric lighting, ample play grounds for the children, reading rooms, etc., etc. One of the most notable of these model villages is that at Roebing, N. J., and illustrated and described in detail in these columns a few years ago. Another is that at Akron, Ohio, where several hundred houses are being erected for the employees of a rubber concern; still another is that at Nanticoke, Pa., and in the accompanying illustrations we show views in the village of homes provided for the foreign workmen employed by a rolling mill company at Middletown, Ohio.

It appears that one of the principal troubles of the company when starting out was the matter of housing its employees, especially the foreigners and their families. An expert, who has had several years' experience in such matters, was called in and as a result of his recommendations a number of cottages and larger dwelling houses were erected on the company's property near the plant, these being rented at a nominal rate to workmen with the understanding that the buildings were to be kept in sanitary condition. Each house is supplied with running water and the majority of them have sanitary plumbing fixtures.

For the past two years as an encouragement to the occupants of these homes to improve their living conditions the company gives out each month 12 prizes of \$1 each for the best kept houses. The small cost of this does not begin to offset the benefit derived in the



A Typical Street Showing a Row of Company Dwelling Houses

subscribed to by the company are on file in the club; stationery is also free and a writing room is provided.

A mutual benefit association is also one of the features of the plan adopted at Middletown, the object being to afford relief to any members who while in the active and *bona fide* employ of the American Rolling

Mill Company may accidentally become injured or through sickness be rendered incapable of attending to or performing their duty, and to enable them to avoid the necessity of appealing for aid when so disabled by collection from their fellow workmen; also to promote the general welfare of its members and bring the workmen of the various departments into closer relationship with one another. A fee of \$1 is charged to cover membership registration and the first month's dues and 50 cents per month thereafter. The company has also independently provided a special accident fund that covers only accidents that result fatally. The amount paid to dependents is regulated by the size of the deceased employee's family and the years of his service.

Architect of New York County Court House

In competition with many of the country's most distinguished designers of public buildings the plans for the new \$10,000,000 Court House of the County of New York submitted by Guy Lowell, 225 Fifth Avenue, were selected by the members of the jury of award, consisting of Frank Miles Day of Philadelphia, Robert S. Peabody of Boston, and John Lawrence Mauran of St. Louis. In its report to the Court House Board

work in architecture at the *Ecole des Beaux Arts*.

Among his work is the new Museum of Fine Arts in Boston, the Emerson Hall at Harvard and the residence of the president of the university; the Cumberland County Court House at Portland, Me.; the country place of Clarence H. Mackay at Harbor Hill, the new Piping Rock club house at Locust Valley, Long Island, as well as several buildings at Brown University, Andover College and Simmons College. He also designed many private residences of note, including those of Harry Payne Whitney, C. K. G. Billings, and Paul D. Cravath.

Death of Charles H. Parsons

Charles H. Parsons, first vice-president of the American Hardware Corporation, died of pneumonia at his home, 310 West Main Street, New Britain, Conn., on the 13th of April, aged 66 years and 2 days. He was born in New Britain, Conn., April 11, 1847; his father being Charles Parsons, a contractor and builder. His early education was acquired in the New Britain schools and this he supplemented with a year's study in a western commercial college.

At the age of 20 he became a salesman for Landers & Smith, and seven years later in 1873, he entered the



Building Modern Homes for Workingmen—View of Some of the Houses

the jury stated that the winning design "fulfills to an unusual degree the exacting conditions of the program. It presents an exterior of high dignity and interest and it gives evidence of great architectural ability on the part of its author. It promises a public monument in every way worthy of the city of New York."

The new court house will be the principal feature of the new civic center to be created just north of the new Municipal Building and will be bounded by Lafayette, Leonard, Baxter and Park Streets. It will contain 51 court rooms and will rise 275 ft. in height. It will consist really of two separate round buildings, one within the other, the outer building being modeled after the Coliseum at Rome. This will be 500 ft. in diameter and five stories, or a total of 200 ft. in height. The inner building will be eight stories high or a total of 275 ft. In addition to its resemblance to the Coliseum from the outside, it will contain a replica of the Pantheon in Rome about the central court or main lobby which rises to a height of three stories.

The successful architect, who was born in 1870, is a member of the Lowell family of New England, he being a cousin of A. Lawrence Lowell, president of Harvard University, and of Percival Lowell, the astronomer. After graduation from Harvard in 1892, he studied for two years at the Massachusetts Institute of Technology, and then went to Paris to carry on his

employ of P. & F. Corbin as salesman, traveling in New England and Canada. In 1879 he abandoned travel and took charge of orders and afterwards of the sales, becoming the first general sales manager of the company. Since that time and until entering his larger field in the American Hardware Corporation, Mr. Parsons had charge of the marketing of the product of P. & F. Corbin.

In 1883 the election of a new secretary of P. & F. Corbin gave Mr. Parsons additional responsibility for the conduct of the business. In 1891 he was made a director and since that time he has successively been elected to the offices of second vice-president, first vice-president and president of P. & F. Corbin. When the American Hardware Corporation was formed in 1912, Mr. Parsons was made a director and assistant treasurer in addition to his duties as an executive officer of P. & F. Corbin. He was later made second vice-president and at the death of Philip Corbin was elected first vice-president of the American Hardware Corporation and placed in charge of the sales, which office he held at the time of his death.

American Society of Engineer Draftsmen has removed from its original office in Nassau street to commodious quarters at 74 Cortlandt street, New York City.

New Publications

Building Construction.—By Charles F. Mitchell. Two volumes; Elementary Course, 472 pages, with 1100 illustrations; Advanced Course, 885 pages, with 800 illustrations. Size of each, 5 x 7½ in. and both bound in cloth. Published by D. Van Nostrand Company. Price: Elementary Course, \$1.50; Advanced Course, \$2.50. Postpaid.

The elementary course is a textbook on the principles and details of modern building construction as practiced in England. The author is the lecturer on building construction in the Regent Street Polytechnic, London, and head master of the Polytechnic Technical School. He is assisted in the writing of the work by George A. Mitchell. The aim of the author, as outlined in the preface, is to give a clear statement of the principles which should govern the execution of building work, for the benefit of the student taking the examinations of the Board of Education in London, and for the practical man engaged in building work. The fact that the work is written entirely from an English viewpoint renders it interesting as a means of comparing the methods with American practice.

Perhaps the most valuable chapter in the book is that on Building Quantities and Memoranda, in which the author takes up the subject of estimating and carries it through the various divisions of construction work. The process of "taking off" data from drawings is considered, embracing excavation and ferro-concrete work, bricklaying, masonry, slating, tiling, carpenter work, plastering, painting, etc. Then follows a discussion of the system of estimating by the cubical contents of the building.

As an illustration of the difference between American and English methods, as treated in this work, may be cited the definition of "external plumbing," which work is said to consist of covering roofs entirely with sheet lead, or those parts on slated or tiled roofs which cannot be made watertight with the latter materials. "For flats, gutters, flashings, etc., lead far surpasses any other material," says the author.

The elementary volume contains the most material of value to the practical worker in moderate cost building, as the greater part of the work is devoted to practical methods of procedure in the different building trades.

The advanced course is nearly twice as large as the elementary course, and goes more into detail in the consideration of the underlying theory of design and construction. The different building materials are considered, methods of testing are discussed, and the principles of mechanics as applied to building construction are considered. The end of the volume is given over to an appendix containing sample examination questions of the London Board of Education on building construction and drawing.

Convention of Building Owners and Managers

The sixth annual convention of the National Association of Building Owners and Managers will be held in Cincinnati, June 10 to 14, inclusive. Secretary Patterson is of the opinion that this will be the largest gathering of realty interests in the history of the Association. The lectures will be delivered on important topics by qualified experts, one of the subjects being "The Method of Determining the Proper Height of an Office Building," by C. T. Coley; another will be "The Duties of a Building Manager During Construction of a Building," by J. E. Randell; another will have to do with "Operating Costs of Rental on the Square Foot Basis," by A. L. Rawley of Seattle. There will also be brief discussions of such subjects as "Utilizing Roof

Space"; "Metering Light to Tenants"; "Relation of Foot Traffic to Store Rents"; "Lobby Tenants," etc.

Convention of Building Trades and Employers' Association

By reason of the disastrous floods throughout the Central West resulting in the utter confusion of railroad schedules, and in fact putting out of commission most of the lines west of Pittsburgh, the attendance at the second annual convention of the National Building Trades and Employers Association of the United States, held in Washington, D. C., March 26 and 27, was rather limited, many of the delegates being storm-bound and unable to reach the city at all or until the meeting was nearly ended. The sessions opened at the Hotel Continental, with Vice-president John R. Galloway of Washington in the chair, President John Atkinson of Philadelphia being unable to attend because of illness.

Mr. Galloway called the convention to order in the assembly hall on the upper floor of the hotel and introduced Cuno H. Rudolph, chairman of the board of District Commissioners, who welcomed the delegates to the city. The address in response on behalf of the delegates was made by Edwin S. Williams of Scranton.

President E. C. Graham of the Builders and Manufacturers Exchange of Washington, also spoke words of welcome to the visiting delegates, to which I. H. Scates, secretary of the Association, and also secretary of the Builders Exchange at Baltimore, made the response.

Various committees were appointed by Vice-president Galloway, including those on "Credentials," with B. K. Nusbaum of Philadelphia as chairman; on "Resolutions," with John Trainor of Baltimore as chairman; on "Nominations," with Franklin M. Harris, Jr., of Philadelphia, as chairman; and on "Auditing," with W. D. Nolan of Washington as chairman.

This practically completed the business of the morning session and the meeting adjourned for luncheon.

At the afternoon session the Committee on Credentials rendered its report, and reports were also made by other committees. One of the principal topics of discussion during the afternoon had to do with the "Uniform Contract."

The important business of the second day's session was the election and installation of officers and the adoption of resolutions recommending that every effort be made to have laws passed in the various states, similar to the one now in force in Pennsylvania, providing for an equitable interpretation of plans and specifications. The following were chosen to serve for the ensuing year:

President.....H. J. West of Baltimore.

Vice-President..H. L. Lewman of Louisville.

Secretary.....I. H. Scates of Baltimore.

Treasurer..George E. Schroder of Baltimore.

The following were elected State Commissioners:

Pennsylvania.....E. S. Williams.

Kentucky.....J. M. Vollmer.

Michigan.....Charles A. Bowen.

New Jersey.....V. P. Costockson.

District of Columbia.....C. A. Langley.

Alabama.....G. T. Stafford.

Maryland.....F. Bennett.

The Commissioners from other states will be appointed by the board of control.

In the evening a banquet was held at the Continental Hotel.

The Wahpeton School of Science, Wahpeton, N. D., expects to have at least four classes in the trade school which will be instituted at the institution the coming fall.

WHAT BUILDERS ARE DOING

Bird's-Eye View of Building Situation in Leading Cities—Estimated Value of the Projected Improvements



ALTHOUGH the weather for the most part was favorable for building operations during the month of March the estimated cost of the new construction work, alterations, repairs, etc., for which permits were issued at that time was slightly less than for the corresponding month a year ago. The decrease was, however, not large, although as reports from additional cities come to hand the difference between this period and a year ago continues to widen. At the time of going to press the figures available show notable changes in specific instances, increased operations in certain sections being offset by equally severe declines in other localities. While there seems to be a tendency to gradual contraction in the planning of new construction work the falling off in leading cities as compared with a year ago may be traced to specific causes. Of course in the flooded districts of the Central West there was an entire cessation of operations the last week in March, which has tended in some measure to reduce the totals for the entire country, and it is possible that this might almost account for the difference in figures between the month under review and those for the corresponding period a year ago.

Some of the leading cities in which there were notable declines in building operations in March were New York City, Pittsburgh, Portland, Ore., Minneapolis, New Orleans, Rochester, N. Y., Denver, Fort Wayne, Hartford, Conn., and Columbus, Ohio. The more notable increases are to be found in Buffalo, Los Angeles, Kansas City, St. Paul, Nashville, Chicago, Baltimore, Milwaukee, and Philadelphia.

Building operations for the first three months were about 5 per cent in excess of those for the corresponding period of 1912, owing to the fact that January and February last year were months of very severe winter weather when it was practically impossible to carry on building operations, while this year the weather was more propitious, thus permitting of a favorable showing as regards the amount of work projected.

Buffalo, N. Y.

Bureau of Building statistics for March show a total of 311 permits issued for the month with an estimated valuation of \$1,694,743, a gain of 234 per cent as compared with March of last year, when the number of permits was 266 and the valuation \$507,000. This large percentage of increase was swelled materially by the fact that the March permits for this year included the Hutchinson High School building, \$705,000, and a 2,000,000-bushel grain elevator for the Washburn-Crosby Company, to cost \$200,000.

Buffalo's showing for the first quarter of 1913 is very favorable, being \$2,519,000, as compared with \$2,162,000 for the first quarter of 1912, an increase of 21 per cent. Indications point to a season of great activity in all classes of buildings—industrial, commercial, municipal and residential. The March list gives an unusually large number of theatres—standard and motion picture—including the \$200,000 Gaiety Theatre to be erected at Pearl and Huron streets by the Shea Amusement Company for the Columbia Amusement Company, lessees; theatre building for Mitchell H. Mark, to cost \$100,000; two others to cost \$50,000 and \$45,000 respectively, and a store office and theatre building to cost \$70,000.

The permits also include a store and loft building for the Buffalo Maintenance Company from plans of Architect Julius C. Schultz, to cost \$48,000; additions to foundry, core room and boiler house and a steel water tower for the Bond plant of the American Radiator Co., \$40,000, and a 3-story factory addition 90 x 460 ft. for the Hewitt Rubber Co. from plans of Engineers Lockwood, Green & Co., Boston and New York.

Also a church edifice for St. Bartholomew's R. C. Church, Grider street, to cost \$35,000, and an addition to stone chapel Trinity Protestant Episcopal Church, on Delaware avenue.

Plans have been completed by Architects Harris & Merritt for an office building for the International Railway Company, to cost \$100,000, and plans are ready for figures for a new sub-station exchange building for the New York Telephone Company, Main street and Park avenue, Central Park district, to cost, with equipment, \$200,000.

Chicago, Ill.

The activities in local building circles continue to be of a heavy nature and the prosperous conditions are still more pronounced. Favorable weather throughout the winter has been a great factor. The spring season has

opened up in good shape and if permits continue to be issued at the present rate 1913 will be a banner year.

There were 937 permits issued in March, consuming 27,480 ft. frontage at an estimated cost of \$7,690,600. The same month in 1912 produced 672 permits with a frontage of 18,531 ft. at a cost of \$4,743,600.

The first quarter of 1913 shows the issuance of 1908 permits, frontage \$59,478 ft., with an estimated cost of \$19,261,500, while the same period of 1912 was credited with 1539 permits, occupying 39,671 ft. frontage, estimated cost \$10,520,000.

An unusually handsome apartment building, six stories in height, will soon be commenced, to cost \$250,000. It will be 49 ft. x 148 ft. and will be built on caisson foundations sunk to bedrock, 135 ft. below the surface. It will be constructed of granite and faced with white terra cotta with bronze, iron and terra cotta ornamental figures.

Another apartment building, costing \$250,000, will be 130 ft. square and will be built of red brick, with stone trimmings, and have a red mansard roof. It will contain twelve apartments.

The apartment building located at the northwest corner of Woodlawn avenue and Hyde Park Boulevard will, when completed, cost \$400,000. A fireproof garage will be built in connection with this structure.

The most important announcement of the month in manufacturing circles comes from the H. W. Johns-Manville Company, which will erect a plant for the purchasing company, estimated to cost \$8,000,000. Ten manufacturing buildings of steel construction, each having a ground area of 125 x 1000 ft., are to be constructed.

Work on the new 21-story Morrison hotel, to cost \$13,000,000, is progressing rapidly. The first two stories will be of white Vermont granite, while the remaining nineteen will be faced with red brick and white terra cotta. The entire structure, when completed, will have a frontage of 200 ft. on South Clark street and 245 ft. on West Madison street. Marshall & Fox are the architects.

Charles B. Dibelka, of Chicago, was recently appointed as State Architect for Illinois, vice W. Carby's Zimmerman, also of Chicago.

Cincinnati, Ohio

The valuation of estimated improvements planned for the month of March, 1913, does not quite equal the corresponding month's report for 1912. This year 1124 permits were issued, with an estimated valuation of \$790,410. Last year 847 permits were taken out, and the total for

improvements was \$868,305. The encouraging feature for this year's report is that the bulk of the amount named covers residence construction and no large contracts are included. Weather conditions have hampered all kinds of building work, especially during the latter part of March.

A comparative statement for the first quarters of 1912 and 1913 show that in the former period the value of the improvements was \$1,801,489 and in the first three months of this year the total was \$2,083,754.

From this it will be seen that the first quarter of this year was better than for the corresponding period of 1912. However, several large buildings are included in the estimates for the present year, which tended to swell the total above normal.

The outlook for a busy summer is bright, but it is quite probable that there will be a scarcity of labor, as the recent floods at Hamilton, Dayton and elsewhere will require a large number of men on repair work in those cities.

Cleveland, Ohio

Building operations in Cleveland during the first quarter of 1913 show a remarkable increase over the corresponding period a year ago, as is indicated by the permits issued by building inspector's office. During the first quarter of this year 1835 permits were issued for buildings, to cost \$4,143,945, as compared with 1150 permits for \$1,715,522 issued during the same quarter of last year, showing a gain of \$2,428,393. The value represented by the permits issued during March is more than twice as much as for March, 1912, and nearly twice as much as for March in any of the preceding three years. Last month 830 permits were issued for buildings to cost \$2,296,480.

In addition to considerable small work a six-story building to be erected by the May Company for department store purposes has been planned. An addition to the Halle Brothers store will soon be under way, the work of excavating having already been started.

With a view of having more artistic minor municipal-owned buildings the City of Cleveland has established a building construction department and appointed Frederick H. Betz city architect, who will design such buildings as street cleaning sheds, park shelter houses, street comfort stations and garbage disposal plant building.

The contractors engaged in concrete work on buildings in Cleveland, Ohio, have formed an association for the advancement of this class of construction and the protection of their work under the name of the Contractors' Protective Association. The officers elected were H. C. Masters, president; Guy E. Conkey, vice-president; James R. Gloyd, secretary, and K. H. Pratt, treasurer.

Detroit, Mich.

The March number of the bi-monthly magazine published for the members and in the interest of the Builders' and Traders' Exchange of Detroit, contains a lot of interesting information regarding the happenings since the first of the year. On the editorial page the statement is made that the work of the Exchange has been going ahead with a vigor and enthusiasm which it is a pleasure to watch and the interest shown in the organization and its growing work by the individual members is referred to as being encouraging and sustaining to the officers and directors. The opinion is expressed that this is going to be "the best year the Exchange has yet had and that it is going to be another busy year is admitted by all. We have been somewhat criticized by some concerns in the city, not members of the Exchange, for the optimistic reports concerning general conditions as reported by the Exchange from time to time in our magazine and the public press. We do not feel that we have done any harm in the slightest degree, but on the other hand see no reason for not reporting actual conditions in the building trades. We believe that optimistic reports, providing they are correct, make for better conditions and engender more faith in the future, and the whole fabric of commercialism is largely based on faith."

Interesting features of the magazine are addresses by various speakers at different meetings of the Exchange, and there is reference to social functions and a long list of personal items which render the little work of special interest. Among the closing pages is a list of some of the important features of the Exchange, such, for example, that it has offices covering 4800 sq. ft. of space in one of the best office buildings in the city; receives and transmits an average of 800 telephone messages every day; has four large light figuring rooms covering 240 sq. ft., has a daily average attendance of members and visitors of 200 and has a larger influence toward good building in Detroit than any other organization.

Indianapolis, Ind.

Building permits issued during the month of March exceeded the totals of the corresponding month of last year

by nearly \$200,000. The number of permits was 454, with a total valuation of \$754,305, as against 315, and a total valuation of \$558,780 for March of last year.

Reports of damage by the recent floods were greatly exaggerated and the Chamber of Commerce was kept busy declining offers of assistance. Officials at Washington believed for a time that the Federal structure in Indianapolis was flooded and James A. Wetmore, acting supervising architect, sent a telegram to the local surveyor of customs, inquiring as to the extent of the damage.

Knoxville, Tenn.

Leading contractors and builders in the city, to the number of 49, recently met and perfected an organization to be known as the Builders' Exchange of Knoxville, Tenn. A great deal of enthusiasm was displayed and the organization starts out with bright prospects for the future. The Constitution and By-laws are patterned after those of the Builders' Exchange at Birmingham, Ala., whose secretary, by invitation, assisted in the formation of the permanent organization.

Los Angeles, Cal.

The local building situation shows marked improvement, the total valuation of buildings for which permits were issued in March being \$3,034,213, against \$1,676,000 for February and \$1,687,780 for March, 1912. This brings the total for the first quarter well above last year's record for the same period. The number of permits issued was 1671, the highest on record for any month. This includes permits for 613 dwellings, valued at \$1,722,968, a marked gain over recent months, while of the more permanent type there were four permits for Class A construction, amounting to \$351,500; 2 for Class B, \$97,000; and 34 Class C, \$487,596. Few large jobs have been undertaken this year up to a few weeks ago, but contracts are now coming out on projects which have long been contemplated.

According to A. C. Martin, architect, secretary of the Building Ordinance Commission, another year may be required to complete the revision of the building ordinance. The greatest difficulty, he says, has been in interpreting the provisions of the old code, which are ambiguous and frequently in conflict. He says the new code will be more stringent, requiring a better class of building, and will leave more to the discretion of the building inspector.

A permit has just been issued for the I. W. Hellman building, at Fourth and Spring streets, to cost \$190,000; Morgan, Walls & Morgan, architects. Other large buildings for which contracts have been let are the Roebbling warehouse, general work to the Alta Planing Mill Company at \$67,000, and steel to Baker Iron Works at \$40,000; a Class A theatre at Pico and Figueroa streets, general contract to the F. O. Engstrom Company at \$105,000, and the Home Builders' 14-story building, steel work let to the Llewellyn Iron Works. In the latter building it is proposed to use the Chew system of concrete floors, by which the 14 stories can be worked in under the 150-ft. limit. The system is one devised by R. S. Chew, engineer, formerly with the San Francisco office of Milliken Bros.

The town of Long Beach is considering the construction of a new concrete city hall, to cost about \$100,000.

Madison, Wis.

The Builders' and Traders' Exchange opened its headquarters at 23 East Main street the first week in March. The purpose of the Exchange is to promote the interests of builders by bringing them in closer relationship; to establish headquarters where the architect, builder, contractor and dealer in builders' materials may meet or come for information upon any matter relating to building. The Exchange is to be conducted on the same general lines as the Builders' Exchange of Milwaukee and it is the aim to put the building business in Madison on a substantial basis through mutual co-operation.

The officers elected when the Exchange was organized in December last are:

President.....Robert J. Nickles
First Vice-Pres.....John J. Blied
Second Vice-Pres.....John T. Blake
Sec'y-Treas.....H. C. Horstmeier.

At the present time the membership consists of something like 90 per cent of the contractors in the various branches of the building industry as well as supply men and architects.

Newark, N. J.

Building operations in the city during the month just closed show an appreciable increase over the month of February as well as a marked increase over March, 1912. The report for last month of Superintendent of Building W. P. O'Rourke shows that 274 permits were issued for new work estimated to cost \$1,173,888, as against 276 permits for improvements costing \$790,234 in March last year.

For the first three months of the current year 624 permits were issued, involving an estimated outlay of \$3,608,236, while in the corresponding quarter of last year 552 permits were taken out for construction work estimated to cost \$1,858,067.

One of the latest operations is that of J. H. Dunn & Sons, who will erect in Belmont avenue, near Clinton avenue, nine brick and frame 6-family flats, involving an estimated outlay of \$254,700.

Some of the unusual activity the last week in March of the current year was due in part to the filing of plans for a class of buildings, which it is expected will very soon be prohibited. This is what is known as the "fore-and-aft" 6-family apartment. The "double decker" dwelling of frame for six families was prohibited by the new code and in consequence the architects developed a plan of placing three families on the front and three on the rear of a building. Such a structure was within the definitions of the building code, but in the opinion of many architects is more dangerous and objectionable than the old "double decker." The ordinance prohibiting the "fore-and-aft" dwellings is expected to become a law shortly.

New York City

Although the weather has been unusually favorable for outdoor building operations the amount of new work planned during the month of March in the leading boroughs of Greater New York was appreciably less than for the corresponding month last year. The falling off is most marked in the Borough of Manhattan, where, according to the figures issued by Superintendent Rudolph P. Miller, plans were filed for 78 new buildings, estimated to cost \$8,412,090, while in March last year 67 new buildings were planned, estimated to cost \$16,326,325. In the matter of alterations and repairs, the work for which permits were taken out last month, involved an outlay of \$2,333,439, as against \$2,737,295 in March a year ago.

Prominent among the plans filed were three calling for structures to cost one million dollars or more, these being the new home for the Morgan banking house, to cost \$1,200,000; a 10-story loft building in West 16th street, to cost \$1,000,000, and a 17-story printing house in White street, costing \$1,200,000. The plans filed also covered a 16-story office building at the northeast corner of Madison avenue and 33rd street, to cost \$400,000; a 17-story store and loft building in West 32nd street, costing \$835,600; an 11-story hotel in West 102nd street, costing \$120,000; a 6-story apartment house at Fort Washington avenue and 161st street, costing \$350,000; another on Northern avenue, near 181st street, costing \$171,000; a 9-story apartment house in West 70th street, costing \$175,000; an 11-story garage in West 61st street, to cost \$325,000; the new Hammerstein Opera House, in Lexington avenue, to cost \$450,000, and two store and loft buildings in upper Broadway, to cost \$150,000 each.

In the Bronx there were 136 new buildings planned last month, estimated to cost \$3,266,925, while in March last year 112 buildings were planned to cost \$3,190,900.

In Brooklyn there was also considerably less new work planned than was the case a year ago, the figures sent out by Superintendent P. J. Carlin of the Bureau of Buildings showing 344 new buildings to have been planned last month, to cost \$2,686,875, while in March last year 521 new buildings were planned, involving an estimated outlay of \$4,363,660.

Adding to these figures the estimated cost of the alterations and repairs for which permits were taken out, the totals are, respectively, for the two periods, \$3,018,295 and \$4,686,495.

In the Borough of Queens plans were approved last month for 648 new buildings, to cost, with plumbing, \$2,541,198, while in March last year there were 551 buildings planned, to cost \$2,245,447, and this was considered the largest total for March in the history of the department. The activity is general all over the Borough, a large proportion of the work being tenements and small houses for wage earners.

One of the principal operations for which plans were filed is that of the J. H. Matthews Company, covering 28 three-story tenement houses, the total estimated cost of which is placed at \$252,000. These builders have already erected dwellings in the Ridgewood section totaling more than a million and a half dollars. The first week in April application was made by them for permits for the erection of 63 three-story brick stores and tenements and three-story tenements without stores, estimated to cost \$567,000. This, with other applications which were made the first week in April indicate that the month will make a very good showing.

For the first quarter of the current year the falling off in the value of the building operations for which permits were issued is especially marked in the case of the

Borough of Manhattan, where 166 buildings were planned estimated to cost \$20,855,115, while in the first three months of last year there were 193 buildings planned estimated to cost \$28,330,200. The only class of building showing an increase over last year is that of factories and workshops. Of these nine were planned in the first three months of the current year estimated to cost \$2,797,000, while in the first three months of last year 16 were planned estimated to cost \$1,578,100. In the case of apartment houses, or "tenements," as they are legally termed, plans were filed in the first quarter of this year for 31 costing \$3,730,200, while in the first quarter of last year 46 were planned costing \$4,820,000.

In the quarter just closed plans were filed for two hotels costing \$4,910,000. The number of store and loft buildings costing over \$30,000 each, for which plans were filed in the first three months of this year, was 16, estimated to cost \$7,558,000; in the first three months of last year there were 32 buildings of this class planned to cost \$9,672,000. Of places of amusement 24 were planned the first quarter of the current year, estimated to cost \$1,683,500, while in the corresponding period of 1912 there were 22 such buildings planned to cost \$2,868,800.

In the Borough of the Bronx there was a decrease as compared with last year, both in the number of buildings planned and in their estimated cost, the permits being 256 and 306 respectively for the two periods and the estimated cost \$7,144,766 and \$8,453,100 respectively.

In Brooklyn there was very little change in the estimated cost of the buildings planned in the first quarter of the current year as compared with 1912, but there was a falling off of 125 in the number of buildings planned. Of buildings for stores and two families 31 were planned this year estimated to cost \$187,500, while in the first three months of last year 65 such buildings were planned costing \$386,300. On the other hand, two office buildings were planned this year involving \$575,000, while in the corresponding quarter last year only one was planned to cost \$20,000. Of frame dwellings 254 were planned this year costing \$696,250, while in the first three months of last year 289 such buildings were planned to cost \$1,003,470.

Philadelphia, Pa.

Records for building operations during the first quarter of the year show a sharp gain over the same period for 1912, permits having been issued aggregating 3,319 and 3,021 respectively, while the approximate expenditure authorized was \$9,187,885 and \$6,986,300 for the two periods. March contributed to this total, according to statistics compiled by the Bureau of Building Inspection, approximately \$6,206,500—a record for the month, which has only been exceeded once in the history of the Bureau, that being March, 1903, when the permit for the Wanamaker building was issued.

It is evident that builders' opinions, expressed early in the year, that spring building would be at a stupendous rate, have been substantiated. During March permits were issued for 1,772 operations, at an estimated cost of \$6,206,500, which covered a diversified range of work. In two story building work an expenditure of \$1,607,050 was authorized, covering 820 operations—exceeding largely the combined figure of January and February, which were 95 and 136 respectively. January expenditure for two story dwellings was \$353,100, while February contributed \$373,425. Compared to the first quarter of last year, when the expenditure for this class of building was \$2,291,540 the past quarter showed a proposed outlay of \$2,333,575, and indications point to a materially larger movement in this class of work during the second quarter.

Outside of a marked gain in dwelling work, March showed a heavy gain in other classes of building work. In manufactories, workshops and warehouses the expenditure represented was \$1,306,795, including the Metropolitan Building, a \$600,000 operation, and a large warehouse for Snellenburg's. The Pennsylvania Railroad took out a permit for a \$703,000 grain elevator, while moving picture houses contributed \$169,000. School buildings, aggregating a monetary outlay of \$823,855, were started, as was also a \$200,000 hospital. Tenement houses were begun costing \$137,000, three story dwellings \$518,925, which together with the two story houses on which work was started brings the total for dwellings to \$2,262,975.

Builders are greatly encouraged by the statistical position for the past three months and now look forward to a season of greater activity than ever. Projected work in dwelling houses is large; there is more of the better class of work in contemplation in different sections of the city. In some sections the construction of cheap two story dwellings has been overdone, but there is evidence of a strong disposition to curtail this class of work. Apartment house work is steadily increasing, particularly that of the more pretentious class.

Mechanics of all classes have been in good demand and

the season opens under comparatively auspicious conditions, labor difficulties, at the time, being at a minimum. Manufacturers of building supplies and materials are actively engaged and a very active season is promised.

McIlvain & Co., who have built several large apartment houses near the central part of the city, are now contemplating the erection of a 12-story apartment house at 18th and Walnut streets. Plans call for 36 suites of 8 and 10 rooms each.

The Richmond Radiator Company has awarded the contract to erect a large manufacturing plant, 350x100 feet, at State road and Devereux street, to H. H. Wehmeyer. The building will cost \$45,000.

It is expected that work on the large addition to the Arcade Building, owned by the Pennsylvania Railroad Company, will be begun about May 1. The addition will occupy the site of the Old Rothchild Building, 12 and 14 South Broad street, and will be 12 stories in height, conforming to the present Arcade Building.

Plans have been filed for a 22-story office building to be erected at 1420 to 1426 South Penn Square for the Finance Company of Pennsylvania.

Berman Brothers have broken ground for a one story brick and terra cotta moving picture theatre, 64 x 152 feet, with a seating capacity of 1,400, to be built at 1237 to 1245 North 52nd street, which is to cost about \$50,000.

Extensive operations have been started or are in contemplation in connection with dwelling houses, among which may be mentioned, the following. An operation just begun by Moss & Taylor on 51 two-story houses, 15x40 feet at 56th and Stewart streets. J. Janke has begun work on 50 two-story houses in the vicinity of Gaul and Westmoreland streets. One of the large projected operations is that of George A. Nahm, which will involve a block of 150 houses, on a plot of ground between 29th and 30th and Columbia avenue and Oxford street. William A. Patterson has started work on 46 two-story dwellings at 36th and Aspen streets. Benjamin L. Miller is reported to be preparing to erect 244 dwellings on a block of ground on the north side of Sedgely avenue, between Kensington avenue and L street. Frank Williams has started an operation of 25 two-story houses at Front and Snyder avenue. Permits have been issued to Daniel Crawford, Jr., for 15 two-story brick dwellings to be built at 61st and Webster streets. Work has been started by Charles T. Hallowell on 21 two-story two-family dwellings at 59th and Carpenter streets. These houses will be 18' 4" x 70' 10". Local contractors are estimating on 100 dwelling houses to be built for the New Jersey Zinc Company at Palmerton, N. J.

Pittsburgh, Pa.

The new and commodious quarters of the Builders' Exchange were opened April 9 with a reception and buffet lunch. During the reception hours more than 100 representatives of the building trades, including contractors, supply men and construction engineers, together with architects, enjoyed the hospitality of the Exchange. The recent merging of the Contractors' and Builders' Club with the Exchange rendered more room necessary and this has been secured by taking the entire Duquesne Way side of the second floor of the Fulton Building. Included in the new headquarters are an assembly room for meetings, a plan room, a social room and offices.

The officers of the organization are:

President.....R. K. Cochrane
Vice-President.....S. P. Trimble
Secretary.....H. S. V. Lord
Treasurer.....Capt. T. J. Hamilton

Building operations for March show a heavy falling off as contrasted with the same month last year, the figures being \$716,817 and \$1,517,452 respectively for the two periods.

Portland, Ore.

Building conditions are by no means as good as last spring, though some improvement was observed in March, and contractors are greatly encouraged at the number of new jobs that are now coming up for figures. Permits were issued in March for buildings of a total valuation of \$992,995, compared with \$735,685 for February and \$1,750,414 for the corresponding period last year.

The Boyajohn-Arnold Company has taken a contract amounting to about \$100,000 for general construction of a reinforced concrete building at Third and Alder streets. The same company has the general contract for a brick and stone building at Third and Flanders streets, to cost about \$40,000.

Plans have been prepared for a brick addition to the Rose City Park school at 57th and Thompson streets, to cost about \$40,000. Bids have also been called for on the Hoffman school, of concrete construction, and for the

Kenton school, the combined cost being estimated at \$75,000. Plans will soon be out for the \$600,000 public auditorium. W. J. Kratz, architect, has plans for a large auditorium and gymnasium of frame construction for the Pilgrim Congregational Church.

The Public Dock Commission has agreed to change specifications for the new public docks from fireproof to mill construction, in order that the work may be carried out promptly.

Architect E. E. McClaran, this city, has plans under way for a new city hall for Newberg, Ore.

Sacramento, Cal.

Notwithstanding dry weather and a very dubious crop outlook, building activities are increasing in Sacramento and throughout the interior of California. The total valuation of buildings for which permits were issued in March was \$569,177, the highest since December, 1911, and as compared with \$146,752 for the previous month, and \$210,834 for March of last year.

While a number of substantial business buildings are under way, the most notable activity is in home building, a considerable amount of which is being done by real estate operators in connection with new tracts that are being opened up, though the class of work is fairly good. A day's record for number of permits issued was set on March 7, when the real estate and building firm of Wright & Kimbrough took out permits for 29 dwellings and bungalows, valued at \$73,950. This company has now under construction 52 houses of this character.

Plans have been drawn for a 5-story concrete bachelors' hotel building, to cost about \$60,000, to be erected on Tenth street, near K.

The Travelers Hotel Company has just taken out a permit for the construction of its new building, to cost \$237,000.

San Francisco, Cal.

The scale of building operations increased somewhat in March, the total of the permits being \$1,599,967, compared with \$1,298,450 in February and \$2,592,780 in March of last year. These figures do not include municipal or Exposition work, and it is noted that the total of contracts recorded last month, including these important items, amounted to \$3,304,815, of which about two-thirds was for private work.

Exposition contracts are now coming out with some rapidity. Lange & Bergstrom have taken the general contract for the Education Building at \$198,691, exclusive of lumber, the plumbing contract going to the Turner Company at \$14,799. James L. Brown is low bidder on the Food Products Building, at \$200,000, with John G. Sutton Company low on the plumbing, at \$16,350. Bids were opened April 15 for the Agriculture Building, and plans have been completed for three fire stations of cement plaster construction, bids to be opened April 22. With the approval of contractors, it has been decided to require a deposit of \$100 from all prospective bidders, to be refunded when plans are returned.

The 125 roof trusses of the Machinery Building are now being erected. They weigh about 5 tons each. A feature of the work is the use of compressed air in place of steam to drive the hoisting engines, etc., the air being supplied by a power plant on the grounds. The contract for roofing material for the Machinery Building has been let to the Pioneer Paper Company of Los Angeles, about 400,000 square ft. of their "Silveroid" asbestos roofing being required.

Aside from the work on the Exposition site itself plans have been formally adopted for the \$1,000,000 auditorium to be erected by the Exposition Company on the Civic Center site, the architects being John Galen Howard, Frederick H. Meyer and John Reid, Jr., who have charge of the entire civic center plans. The building will be of Class A construction, with an octagonal dome 190 ft. in diameter. It will have seating capacity for 11,000 and banquet space for about 4,000, a large and well-equipped kitchen being included in the plan.

The building material market shows a few slight changes. Structural shapes are coming in somewhat more freely, though local shops are still greatly hampered, and the demand for reinforcing bars and fabric is growing. The brick situation is unchanged, though cement manufacturers report an unusually large demand for this time of year. Cedar shingles are strong and advancing, though the fir lumber market is easier, owing to the resumption of logging and increased offerings of coastwise steamer space.

The General Contractors' Association held its first regular business meeting in its new home March 13, when the 250 members present decided on a campaign to bring all contractors in the city into the organization. The principal topics for discussion were prospective legisla-

tion and local water rates, the contractors claiming that they are "held up" by the water company. The new officers of the association are: Charles W. Goipertz, president; A. H. Bergstrom, vice-president; Charles A. Day, treasurer, and William E. Hague, secretary.

The new officers elected by the Builders' Exchange are: James A. Wilson, president; R. Herring, vice-president; R. J. H. Forbes, secretary, and C. W. Withington, treasurer.

Plans are being drawn for two buildings which will be among the most important in the city. One will be built at Fourth and Market streets for John D. Spreckels, and according to plans by Reid Bros., architects, will be 25 stories high, about 9 stories higher than any building erected here in the past. It will be of steel and reinforced concrete, with an estimated cost of \$1,500,000. The general appearance will be somewhat similar to the Claus Spreckel's building at Third and Market streets. The other building mentioned will be 12 stories high, and will be built on the Hobart estate lot on Market street, near Montgomery, one of the largest single holdings in the business district. According to Willis Polk & Co., architects, the cost will be about \$1,000,000. In addition to these, architects Ross & Burgren are drawing plans for a 9-story Class A apartment house to be built on Fillmore street, near Broadway, at an estimated cost of \$270,000. Miller & Colmesnil, architects, have plans for a 6-story concrete building at Eddy and Mason streets, to cost \$75,000; and Ross & Burgren, architects, have plans for a 4-story brick hotel at Sixth and Clara streets, to cost about \$75,000.

Architect George H. Howard has plans for a \$100,000 residence to be built at the suburb of Hillsborough for C. F. Kohl.

Bids will be opened May 10 for the construction of naval hospital buildings at the Pearl Harbor naval station, Honolulu, T. H., for which the authorized expenditure is \$280,000.

The Honolulu Planing Mill Company has taken a contract at \$42,363 for the Hackfeld store building at Lihue, which will be the largest mercantile building on the island of Kauai.

San Diego, Cal.

In building values for March, San Diego stands second only to Los Angeles of all the Pacific Coast cities. The total valuation of buildings for which permits were issued was \$1,897,998, compared with \$575,840 for the previous month, and \$537,960 for March, 1912. The best previous records were April of last year, \$1,062,631, and September, \$1,596,859.

The John Simpson Construction Company has taken the contract for general construction of the Southern California Counties Building of the Exposition at \$65,252. It is announced that the State of Arizona will put up a \$75,000 building at the Exposition.

M. D. Goodbody has taken the contract for foundations for the 6-story Sefton hotel building, which will cover an area 100 by 200 ft., and will contain 300 rooms. The entire cost is estimated at \$200,000.

St. Louis, Mo.

The very favorable weather for building operations in March, as compared with the blizzard conditions which existed a year ago, is largely responsible for the very flattering showing made by the Building Commissioner in his report for March. The activity characterizes all sections of the city and takes no account of the large number of new residences authorized in Parkview or the new tenements in other sub-divisions beyond the city limits, all of which are intended for occupancy by those who work in St. Louis. There were no single large permits issued, but the work authorized was chiefly residences of an average cost of \$3,100 and flats and apartment houses costing on an average \$5,500.

According to the report of the Building Commissioner there were 460 new buildings planned last month, estimated to cost \$1,308,939, while in March last year 416 were planned, costing \$993,241. Alterations were about the same in both periods, figures being \$144,000 and \$143,897 respectively.

Seattle, Wash.

The lessened activity in the planning of frame construction during the month of March was responsible for the unfavorable showing which the figures for that month make when compared with the corresponding month of last year. According to the figures of R. H. Ober, superintendent of the Department of Buildings, there were 845 permits issued in March for building operations, involving an estimated outlay of \$768,850, while in March last year there were 914 permits issued, calling for an expenditure of \$848,985.

Of the totals for last month 170 permits were for detached residences valued at \$328,380, as contrasted with 208 buildings of this class for which permits were taken out in March, 1912, and valued at \$297,785. There were also 3 permits issued for fireproof construction, costing \$275,000, as against one building of this class involving an estimated outlay of only \$30,000 in March a year ago.

For the first quarter of the current year there were 2,211 permits issued by the department for buildings valued at \$2,798,185, while in the corresponding quarter of last year there were 2,451 permits issued for buildings valued at \$2,097,735.

How to Ebonize Oak

A recipe given by a French contemporary for imparting to oak the appearance of ebony is as follows: After having been cut up the wood is immersed for forty-eight hours in a hot saturated solution of alum, and then sprayed repeatedly with a decoction of logwood. Small pieces can be immersed in the decoction instead of being sprinkled. The decoction is thus prepared: Boil 1 part of the best quality of logwood in 10 parts of water, filter through cloth, evaporate gently until the volume of the liquid is reduced to one-half the original amount, and add for each litre from ten to fifteen drops of a saturated solution of indigo, perfectly neutral. After having treated the pieces of wood with the logwood decoction rub them with a hot saturated solution of verdigris (hydrated dibasic cupric carbonate) in concentrated acetic acid, and repeat the process until the required depth of tint is obtained. It is stated that oak thus treated presents an appearance very similar to that of true ebony.

Cutting Concrete by Oxy-Acetylene Torch

The four-story and basement concrete and steel building formerly occupied as a brass foundry by the Crane Company, Chicago, Ill., has recently been wrecked to make room for the new freight depot of the Central Terminal Railroad Company. This provided an opportunity for the application of a novel method of taking down concrete work. Oxy-acetylene gas torches were used to cut all the metal parts, such as girders and reinforcements, and by accident it was also found that it could be effectively used in cutting concrete.

For the latter work, the acetylene and oxygen pressures were increased to 20 and 50 lb. per square inch respectively. Holes through an 8-in. concrete slab $2\frac{3}{4}$ in. in diameter and through two $\frac{3}{4}$ -in. iron rods were drilled in $2\frac{3}{4}$ min. The "T" beams encased in concrete and supporting the floors were cut in 12 min. and under the action of the torch, the concrete seemed to disintegrate as if it contained water. The holes were cut by the torch in the center of each floor panel and the size was then increased by breaking the concrete with heavy sledge hammers.

Storage Vault for Drawings

A fireproof storage vault for tracings of drawings is in use by a Belgian institution, in which the storage arrangement comprises earthenware pipes, a few inches in diameter, set in a mass of concrete. Stamped steel covers are used for closing the tubes and for containing the information concerning their contents, such as a suitable numbering system. To avoid destruction in the event that water at a time of fire or for other reasons might get into the tubes, they are inclined slightly toward the opening to facilitate drainage. Tracings thus kept are reported to be in altogether satisfactory condition after four years of use, and this fact is attributed to the equable temperature which obtains.

(Continued on page 253)

BUILDERS' APPLIANCES AND EQUIPMENT

Some Things of Seasonable Interest to Those Having
to Do with the Building Business

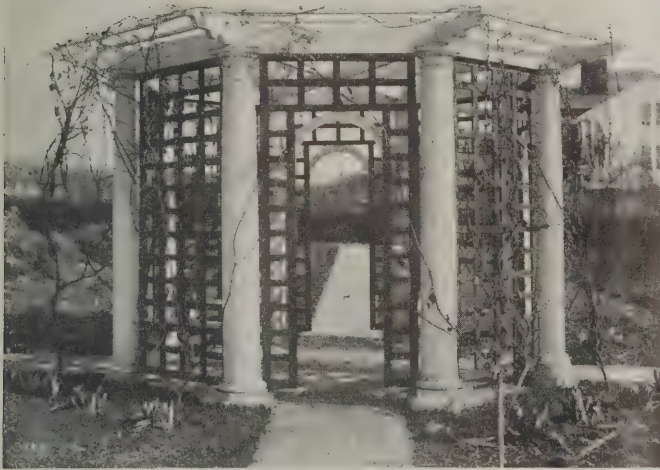
Artistic Effects in Pergola Construction

The increasing interest in the decoration of gardens and grounds surrounding private residences and in the erection of artistic shelter and other houses in public parks and recreation places has led to the building of many forms of structures in which the column is the predomi-

"Album No. 28, for 1913," and is devoted to the pictorial display of different pergola effects which may be produced by the use of wooden columns and timbers. The examples given employ the Koll's Patent Lock-Joint Column, manufactured by this company, in which the principal feature is that of interlocking sections, which are said to prevent the column from breaking apart from the effect of settlement or weathering.

The McKay Concrete "Forms"

The McKay Concrete form system has been designed to make possible the use of the ordinary wooden forms employed on concrete work, without the waste and inconvenience to which the latter are subject when used without any other system of support. The system devised involves the use of steel uprights and stringers, held together with patent clamps, and so constructed that the wooden form boards may be removed without displacing the frames, thus leaving the latter to continue to serve as a partial support to the green concrete, and still release the timber for use on other portions of the job. The company claims that its product is well adapted to the uses of the builder engaged in residence and other light building construction work, and that a concrete form can be erected with this system at a cost of $\frac{1}{2}$ cent per square foot. The statement is made that 92 per cent of the material can be released at the expiration of from 4 to 24 hours. In using the system, as the wall grows, the uprights are either lifted or telescoped into higher positions. If lifted, alignment is kept by bolting them to the finished wall. Plates can be released from arches and columns, it is stated, in from 12 to 24 hours after the concrete has been placed. When the system is employed for reinforced work, the rods are supported by the uprights before the concrete is placed. In the case of walls, it is stated, that the concrete footing and the wall proper can be placed at the same time without leaving any joint between the two sections. Where foundation work is



Artistic Effects in Pergola Construction—Fig. 1—An Octagonal Latticed Summer House

nant feature. One of these forms is the pergola, which is a columned way not covered by a roof.

The adaptability of this form of structure for almost any condition and its ease of erection make it a desirable asset in the field of the master carpenter and the builder. In the illustrations here given we show two of the more simple forms of pergola construction, although neither of them comes under the exact head of the pergola, as the term is generally used by architects at the present time, for, in the one case, the structure is really a house, while in the other, the lattice work between the columns removes it from the pergola classification.

Fig. 1 represents an octagonal latticed summer house on the grounds of the Finley residence, at Great Neck, Long Island, N. Y. It is placed at the intersection of two walks and measures about 10 feet across.

Fig. 2 is reproduced from a photograph of a Japanese house over a path on the estate of W. D. Boyce, Ottawa, Ill. The effect is produced principally by the curved ends of the rafters and the design of the column capitals. A substantial roof surmounts the structure.

Not only are these structures suitable for formal gardens and extensive grounds, but they may be utilized to relieve the barren ugliness of the backyards of city apartments. Wherever the light is sufficient, they may be draped with vines and flowering plants.

The pergola construction is now being employed for the porches of hospitals and sanitariums, where it is desired to provide as much light as possible. The columns are surmounted by stringers upon which rest rafters with no covering.

The illustrations here shown are taken from "The Pergola," just issued by the Hartmann-Sanders Company, Elston and Webster Aves., Chicago, Ill. It is designated as



Fig. 2—A Japanese House Showing Pergola Effects

being done but one side of McKay forms need be used, according to the company, and the uprights will support the wall as well as is done by the ordinary wood forms.

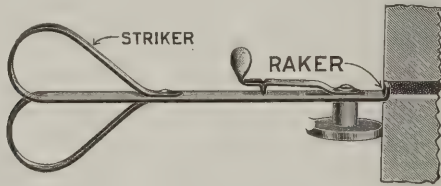
In an illustrated booklet describing the system in full, attention is called to the fact that by means of it concrete

partitions one inch thick may be produced at a cost which competes favorably with that of the materials generally employed for the purpose at the present time. The company manufactures sets of forms for the construction of complete concrete houses, one of the stock sets being designed for a dwelling 20 x 25 ft. in plan area. Any desired modification may be made in the design of a house, and special conditions may be met by telescoping or lengthening the various members supplied.

The system was devised by S. R. McKay, president of the McKay Concrete Form Company, Marbridge Building, 6th Ave. and Broadway, New York City, maker of the equipment.

Jackson Combination Joint Raker

A device which is of special interest to the brick layer is the combination joint raker illustrated herewith. The raker, jointer and striker combined as shown in Fig. 3, makes a smooth, perfect raked-out joint. It is adjustable to any depth of joint and is so made that there are no



Jackson Combination Joint Raker—Fig. 3—General View of the Tool

screws or nuts to work loose. The revolving wheel prevents wear and at the same time it does not mar the work or cause irregular depths in joints. A still further merit is that the wheel revolving against the brick makes it easier for the mechanic to handle the tool. The device is made of a special grade of steel thoroughly tempered and is said to be first class in every respect. The handle of the raker forms two strikers which will clean out any mortar that may collect and the statement is made that where this striker is used there is no necessity for a brush. In order to adjust the raker which is shown in use in Fig. 4 of the cuts, it is only necessary to swing the lever to the side and move the wheel backward or forward to the depth desired, then swing the lever back into place and the wheel is positively locked in position. The tool is made regularly in two sizes, the No. 1 being 8 in. in length and intended for $\frac{3}{4}$ to $\frac{1}{2}$ -in. joints and No. 2 of the same length intended for $\frac{1}{2}$ to 1-in. joints. We

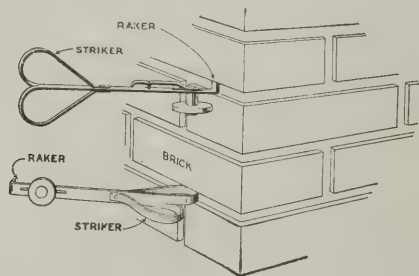


Fig. 4—Showing How the Tool is Used

understand that special sizes are made to order. The tool is known as the Jackson Combination Joint Raker and is made by Joseph Woodwell Company, 201-203 Wood Street, Pittsburgh, Pa.

Copper Weather Vanes

An automobile weather vane is one of the novelties presented in the new 30-page catalogue just issued by E. G. Washburne & Company, 208 Fulton Street, New York, N. Y. It is an exact reproduction of a standard touring car 36 inches in length and gilded with gold leaf. Another design represents a runabout and has a length of 26 in. Many other designs are listed and each is well illustrated with a picture colored in gilt and accurately depicting the product described. Roosters and farm animals have a prominent place in the list, while fish and other distinctive designs shown are intended for the use of particular industrial establishments. A neat design is that of a quill pen whose point indicates the wind direction.

These weather vanes are made entirely of copper and brass, the balls are of copper, the points of compass of cast iron, while the upright rods are of wrought iron, with steel spindles on which the vanes revolve. All parts are either painted or gilded and it is stated that 22-karat gold leaf is used in the gilding of compass points, etc.

Besides the large number of stock designs carried, the

company states that it is prepared to furnish vanes on any pattern desired. Balls for flag poles and lignumvitæ flag pole and topmast trucks are also manufactured by this company, and it is prepared to furnish and install lightning rod systems. Any reader who desires a copy of the catalogue can obtain it on application to the address given.

Sand's Plumbs and Levels

Some very interesting information relative to the plumbs and levels made by J. Sand & Sons, Detroit, Mich., is contained in a pamphlet which is being distributed among the trade. Mr. Sand started his life work as a bricklayer some 30 years ago and he found it necessary to use an instrument that would be more useful than the old-fashioned plumb stick with bob, so he made for his own use a level that would also serve the purpose for a plumb, and this became so popular that his friends induced him to make a few of them. The constantly increasing demand for the tool, however, finally forced Mr. Sand to put up a small shop to supply the requirements. As the business grew he enlarged his facilities and gradually invented and perfected different styles of plumbs and levels until today the variety is so complete as to meet all requirements in this line. Reference is made in the pamphlet in question to the materials and workmanship of the tools and also to the finish. Illustrations are given showing the leading styles and any carpenter, bricklayer or mason who may be interested in securing a copy of this little work can do so by writing to the address above given.

Whipple's Combination Carpenter's Bench Hook

A bench hook embodying features which render it of special interest and value to carpenters and which will be found convenient for use in connection with a great

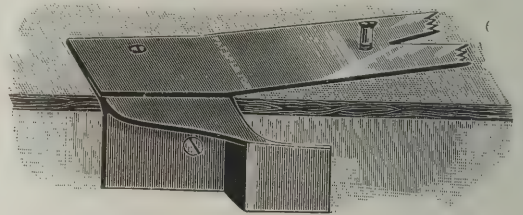


Fig. 5—Whipple's Combination Carpenter's Bench Hook

variety of work is Whipple's Combination Carpenter's Bench Hook illustrated in Fig. 5 and which is being furnished the trade by A. I. Potter, Box 176, Springfield, Mass. This hook is made of malleable iron and steel and the manner in which it may be used upon the work bench is clearly indicated in the picture. It is of such a nature that it may be quickly adjusted to a temporary bench, is very convenient and by means of it the carpenter may hold in place for planing all sorts of work which he would naturally be called upon to do in connection with his chosen calling. The illustration so clearly shows the advantages of a bench hook of this character that extended comment would seem to be wholly unnecessary.

Advantages of Parcel Post Delivery

In our last issue we referred to the use made of the Parcel Post delivery immediately after it went into effect on January 1 by the Interior Hardwood Company, Indianapolis, Ind., in sending out a thousand samples of hardwood to various sections of the country. The experiment, if such it may be termed, met with so gratifying a success that the company is sending out another ton of wood samples under Parcel Post rules to all parts of the United States. By this plan it is possible to reach every section of the country with samples of product more rapidly as well as more economically than under the old arrangement.

Why Homes Should Be Equipped with Sliding Doors

One of the very interesting features of the March issue of "DooR-Ways," the house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill., is the announcement of a contest open to all in which prizes aggregating \$100 are offered. These prizes are for a 200-word article setting forth the best reasons why homes should be equipped with sliding doors. All articles must be submitted to the company on or before May 15. The names of the winners and judges will be announced and the three best articles published in the June issue of "DooR-Ways." Another interesting feature of this issue of "DooR-Ways" is an illustrated article dealing with private garages. The illus-

trations show plan and exterior view and in connection with the descriptive text is an estimate of cost. In this connection mention may be made of the fact that the company issues a special catalogue on garage equipment, which will be sent to interested architects, contractors and builders on request. There is much other valuable matter, prominent among which is an article entitled "Profit on What We Sell," by Harry de Joannis, the Western representative of *The Building Age*.

The Double Claw Hammer

A double claw hammer which will pull out a nail without bending it, and which can be used to hold the nail until the first blow has fixed it in the wood, is the distinguishing feature of the Double Claw Hammer.

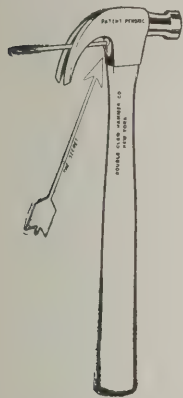


Fig. 6—The "Hynaler" Hammer for Ceiling Work



Fig. 7 — Double Claw Hammer in Process of Starting a Nail

The Double Claw Hammer

mer, as given in the literature issued in support of this article. A hammer with a single claw, but which is said to be equally efficient in holding the nail for the initial strike, is also described. These two implements are illustrated in the cuts shown herewith. In Fig. 6 is shown the single claw tool with a nail fixed in the claw ready for driving. The head of the nail bears against the solid metal shank of the hammer head, being held in place by wedging in the crotch between the two legs of the claw. After the first blow, the hammer is reversed, and the nail driven in the usual manner. Fig. 7 shows the action of the double claw tool in the process of starting a nail for high driving. In Fig. 8 is shown the new and the old way of removing a nail. The latter is first lifted by the nearer claw until the nail head is within reach of the jaws of the second claw. The angle at which the second claw is applied to the work is approximately the same as that of the initial lift, and consequently there is less tendency to bend the nail in its removal than is the case by the old plan. The Double Claw Hammer Company, 453 Broadway, Brooklyn, N. Y., calls attention to the fact that the use of its single claw hammer known as "Hynaler"

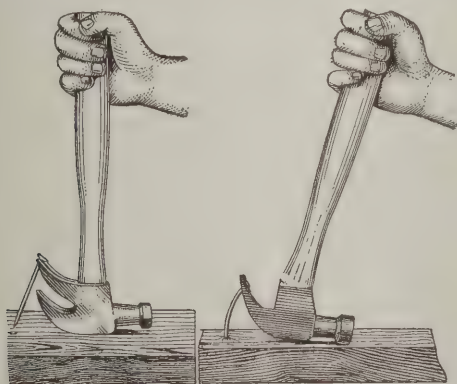


Fig. 8—The New and the Old Way of Pulling a Nail from a Board

makes possible the accomplishment of nail driving in a ceiling with a much less expenditure of energy than is possible with the ordinary tool.

Offer to Carpenters by the Gage Tool Company

Doubtless there are many building mechanics who have lost their tools through the devastating floods which visited the central west during the past month and in con-

sideration of this fact the Gage Tool Company, Vineland, N. J., has decided to furnish beechwood self-setting planes at one-half the regular list price f.o.b. Vineland, N. J., to those who write that they have thus lost their tools and enclose the necessary amount. The company points out that this price is far below the entire combined discounts and commissions it has ever allowed jobbers, salesmen and agents, and is intended solely for those who have lost their tools through the late floods, tornadoes and conflagrations that devastated portions of the country. The offer is for a short time only and is for those who live where self-setting planes are not sold.

In this connection it is interesting to note that the acting postmistress in Vineland has recently effected the largest single sale of stamped envelopes ever recorded at that office. The sale was made to the Gage Tool Company and consisted of over 20,000 stamped envelopes, every one of which carries on both sides illustrations of the self-setting planes made by the company.

The "Quik-Ope" Hot and Cold Water Faucets

An improved form of faucet which cannot fail to be appreciated by architects and builders as well as by every member of a household is illustrated in Fig. 9 of the engravings, and which represents a view of double bath cocks with china index handles. The material used in the construction of these faucets is best quality of red brass triple nickel plated. The construction is such that the steep and short square cut threads open and close the positive compression action exactly on a quarter turn. The seats are raised and rounded; the washers are recessed and all bearing surfaces and parts are machined and fitted with the greatest accuracy. The claim is made that the improved stuffing box and English trim cap screw will positively prevent opening and leakage under any pressure. The construction has been amply proven by the severest factory and service tests. The handles of "Quik-Ope" bibbs and faucets when closed extend at right angles to the bodies and open right or left hand. In the case of the china handles shown in the picture they are marked "Hot" or "Cold," while the metal handles have the letter "H" or



Fig. 9—The "Quik-Ope" Hot and Cold Water Faucets

"C" cast in them. This new form of faucet is being placed on the market by the Haydenville Company, Haydenville, Mass., and with New York office at 150 Nassau street. The company has just issued a very attractive catalogue of 120 pages profusely illustrated with finely executed engravings showing leading lines of high grade plumbing brass goods, especially adapted for residences, apartment houses, business buildings, hotels, institutions, etc. It is of a nature to constitute a desirable addition to an architect's and builder's library of trade literature.

New Edition of "Oak Flooring"

We have received from the Oak Flooring Bureau, 895 Hammond Building, Detroit, Mich., a copy of the fourth edition, just off the press, of that interesting booklet entitled "Oak Flooring." It is a well-known fact that oak flooring is often very badly abused through ignorance and carelessness both in laying and finishing and the information contained within the covers of the booklet in question cannot fail to prove instructive reading to the builder, the floor layer as well as to the contractor, the manufacturer and even the houseowner.

We are informed that the booklet is the result of ten years' careful study on all the subjects mentioned within its covers and it is therefore regarded as authoritative. Special care has been taken to present nothing but practical advice for the handling, laying, scraping, finishing and care of oak floors. Every detail from the bundle to the finish floor has been given due consideration so that it may be easily understood by even the layman. Quality, distinctness and durability are prime requisites and the point is made that oak flooring combines all three in the highest degree and places it in a class entirely by itself.

Among the early pages Grading Rules of Oak Flooring are succinctly presented and there are directions showing

how to arrive at the amount of oak flooring required for any given space, also the standard weights of oak flooring. In conclusion the statement is made that "a home is half furnished when laid with oak flooring."

Crescent Motor-Driven Universal Woodworker

A machine which cannot fail to be of special interest to carpenter-contractors and all others operating wood-working shops, and which is said to be constructed on entirely different lines from other combination machines, is illustrated in Fig. 10 of the engravings. It is known as the Crescent Universal Woodworker; is motor driven and consists of a combination of machines, each independent of the other, compactly arranged and self-contained. Each of the machines is so disposed as to give an easy and natural position to the operator and the material being worked is handled as conveniently as with the usual separate machines. The base is made of a single casting with planed-off surfaced ore pads upon which the various parts are mounted, this insuring stiffness, accuracy in the alignment of the machine and no vibration when running. The base is provided with three large casters to facilitate the moving of the machine on the floor. One of these casters is seen at the right of the picture, while the other two are located underneath the base at the opposite end. When permanently placed the machine does not rest on the casters but each caster has a set screw so placed above it that when the set screw is tightened down the screw and the caster act as a jack, lifting the machine off the floor and supporting the weight on the casters. In this position the machine may be easily moved to any desired place. There are five units proper to the completed machine—a band saw, a jointer, a shaper, a saw table and a borer. By means of special attachments the machine is adapted for use as a re-saw, hand-feed molder, tenoner, panel-raiser, pole-rounder, disk-grinder, knife-grinder, plain grinder and hollow chisel mortiser. The machine is provided as shown with a very convenient and compact motor drive, the arrangement being such that the motor is not in the way, when operating any part of the machine; in fact, the whole machine is self-contained and there are no long horizontal belts to take up floor space. Referring to the machine here illustrated, "D" is the lever for starting the jointer, "E" the lever for starting the shaper and "F" the crank for raising the shaper spindle. This machine is one of the latest additions to the already extensive line of woodworking machinery turned out by the Crescent Machine Company, Leetonia, Ohio.

The company has just issued its 1913 catalogue of Crescent Woodworking Machinery and special reference is made to the new features which have been incorporated in that line. The catalogue is of a size and shape in keeping with previous editions of the literature turned out

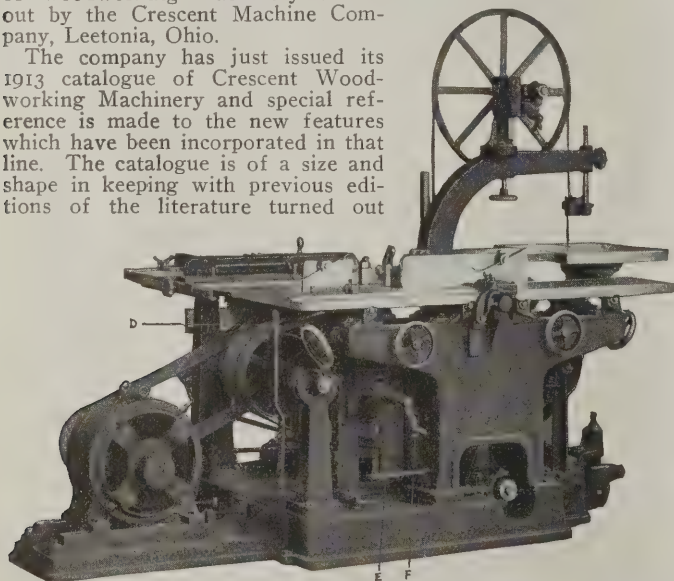


Fig. 10—The Crescent Motor-Driven Universal Woodworker

by this well known and enterprising concern. It consists of 128 pages of letterpress profusely illustrated with well executed engravings practically all of which are half tones made directly from photographs of the finished machines and their parts. In compiling the catalogue the effort has been to give ample information such as a careful buyer usually requires and to give it in as comprehensive a manner as possible. Not only are dimensions, weights, sizes, power required, etc., given in connection with each machine, but there are also code words which can be used in telegraphing orders. Not the least interesting feature is a statement of horse power required for various machines, also a table of freight rates for the classification under which woodworking machinery is being shipped in less

than carload lots, per hundred pounds. The statement is made that the next Crescent catalogue will be issued in December, 1913.

Caldwell "Junior" Door Holder

A device which will appeal to builders in general and to house owners in particular is the Caldwell "Junior" door holder, illustrated in Fig. 11 and which has been placed upon the market by the Caldwell Manufacturing Company, 5 Jones street, Rochester, N. Y. It is made in both gray iron and bronze metal finish and is adapted for use upon interior doors only, where a light fastener is needed. The new device has no side ears and only one screw is visible. A bracket fixes the holder to the door, and the claim is made that it will remain securely in place and that it will hold on the smoothest floor.

The "Junior" is listed in the new 30-page catalogue issued by the Caldwell Company, in which is illustrated the extensive line of hardware novelties carried by this firm. Considerable space is given to the Caldwell car window and marine sash balances, aluminum bronze sash ribbon, Empire sash lock, Acme window fastener and Acme door stop, etc. The Handy rule gauge is illustrated, and the operation of the "Dime" screen door check is described. The closing pages of the catalogue are devoted to miscellaneous articles, such as the Gem nutmeg grater, the "Boucher" adjustable shaving glass and the line of trouser and skirt hangers manufactured by the company. A garment rack is illustrated which will hold six skirts or pairs of trousers.



Fig. 11—The Caldwell "Junior" Door Holder

Catalogue of Union Metal Columns

Architects and builders as well as individuals who are planning the erection or remodeling of buildings are likely to find much that is of interest in Catalogue No. 11 which is being distributed by the New York office of the Union Metal Mfg. Company, 525 Clifton street, Canton, O. This work is an excellent example of the printer's art and consists of 28 pages profusely illustrated with well executed engravings and is bound in paper covers with attractive side title. The catalogue illustrates and describes the Union metal columns as designed for use in the construction and ornamentation of private and public buildings for porches, pergolas and interiors. A number of the most popular designs of Union columns are shown, together with specifications, stock sizes and other data. The steel used in making the shafts of the columns is rolled especially for the company and is tight coated with special spelter which is claimed to adhere perfectly to the metal under all conditions, thus protecting it from the action of the elements. The shafts are also properly painted at the factory with a coat of high grade paint especially prepared to adhere to galvanized steel, thus insuring the finishing coats of paint against cracking or peeling off. The cast-iron parts of the columns are also given a coat of best metallic paint at the factory. The seams of the metal column shafts are securely locked and are always turned on the inside of the shaft. This leaves the outside smooth with the exception of a very small fissure which may be filled with putty before the finishing coat of paint is applied. The shafts of the columns up to and including 14 in. in diameter at the base are made of one-ply No. 24 gauge galvanized steel and all shafts over 14 in. in diameter are made of two-ply No. 24 steel pressed and fluted together.

In the catalogue under review there are nearly fifty photographic views of buildings ranging all the way from the modest cottage to the elaborate mansion and public building, in the construction of which Union metal columns have been important factors. The exhibit clearly demonstrates the claim of the manufacturer that the product is suitable for all climates and temperatures and is clean cut and highly ornamental in appearance.

We are informed that copies of this catalogue may be obtained upon application to the New York City headquarters of the Union Metal Mfg. Company located at 30 Church street.

(Continued on page 42)

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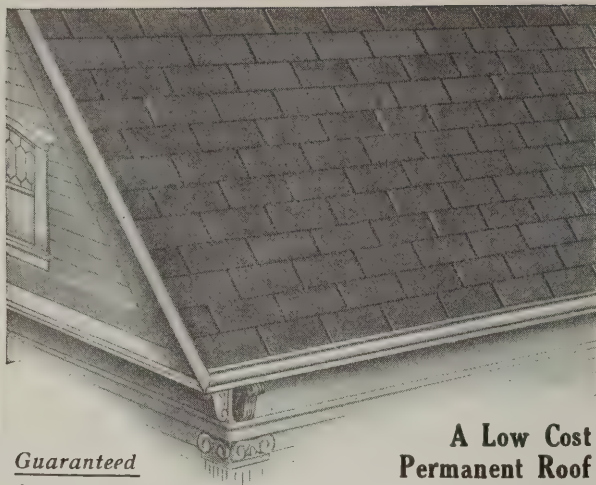
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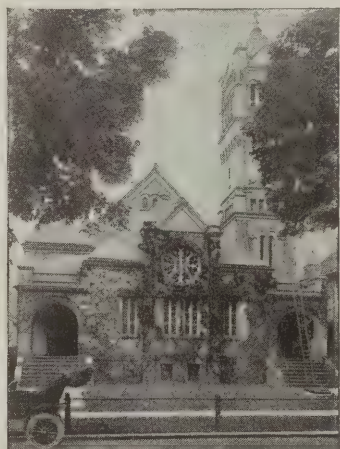
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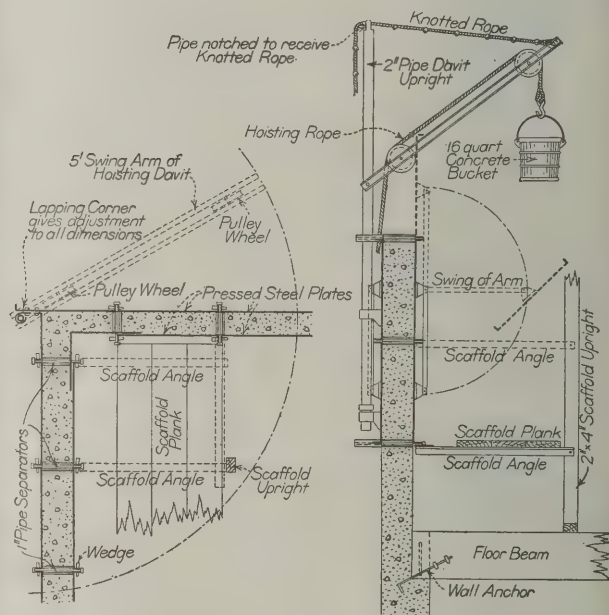
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Hoisting and Placing Concrete at Low Cost

The contractor on small buildings very often works at something of a disadvantage in the placing of his concrete. The initial cost and operating expense of the spouting method, as practiced on large contracts, is prohibitive in the case of smaller structures, and there is great need of some simple and inexpensive device to be used on small building construction. Such a device has been designed by Milton Dana Morrill, of the firm of Read & Morrill, 179 Joralemon St., Brooklyn, N. Y., to be used in connection with the Morrill steel forms. This device, illustrated in Figs. 12 and 13, is a simple hoisting davit to be shifted as the work progresses. A two-inch pipe upright is clamped by wedge connections to the corner plates, being arranged to swivel and to turn easily. A swing-arm is attached to this pipe upright, or boom, made up of two light channels with ball bearing sheaves for the hoisting rope. From the end of this swing-arm, a knotted rope or guy passes through the notched head of the pipe, permitting the lowering or raising of the arm or boom. This davit swings out upon the mixing board or to the mixer. The heavy sewer buckets containing sixteen quarts are filled and hoisted, after which the davit is swung to the desired point, and this concrete dumped into the forms. The hoisting rope passes through a snatch block pulley attached near the ground; the bucket is raised by hand by a friction drum on the mixer or by horse. After the pouring is completed at one point, this davit is unclamped and moved, being attachable at any point. This hoist is of such a simple, inexpensive type that several of these davits can be utilized if desired at the same time.

A light system of interior scaffolding is supported on scaffold angles, nailed to 2 x 4 uprights. These angles are below the forms themselves. This permits the steel



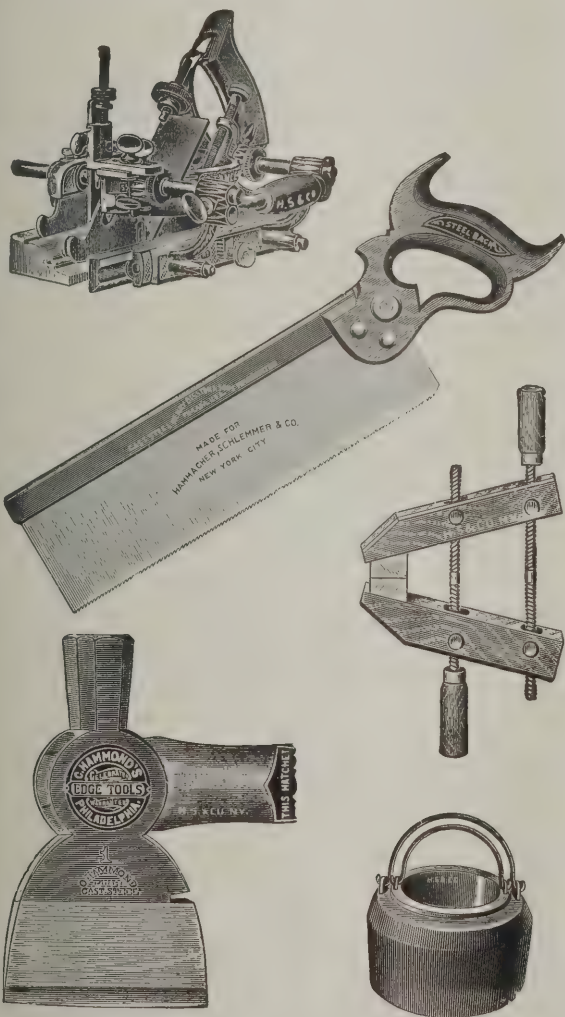
Figs. 12 and 13—Details of the Morrill Device for Hoisting Concrete During Building Operations

forms to be easily swung up in tiers of from 10 to 15 plates, at one operation, thus permitting three or four men to raise and place a section of from 40 to 60 sq. ft. of forming in a few minutes. The outside forming is swung up in the same method by this system of swing-arms. After the forms are raised, additional scaffold angles are attached, and the scaffold planking replaced above ready for pouring the next tier. Unskilled labor is largely utilized, and by means of the wedge connections the forms are brought automatically into line. At each corner where four plates join, a pipe separator is utilized through the wall. These pipe separators are knocked down and removed as soon as the forms are raised and the holes are pointed. By this method the plates are removed from the wall upon the day following the pouring. At this stage it is possible to go over the exterior surface with a wire brush, exposing to view the aggregate; or to float this with sand and cement, leaving a plain stucco surface. The forms being entirely of pressed steel, leave a slight raised joint or mark dividing the walls into 2 ft. panels. On many buildings this has been left, forming a somewhat decorative effect. At each story height the walls are offset on the inside, giving a slight ledge for support of the concrete floor slab or for the wood joists, if such are employed, short reinforcing bars being first bedded in the wall with the ends projecting upwards. After the removal of the forms the ends of these bars are bent out, the joist placed, and this wall anchor is tied to the beams

(Continued on page 44)

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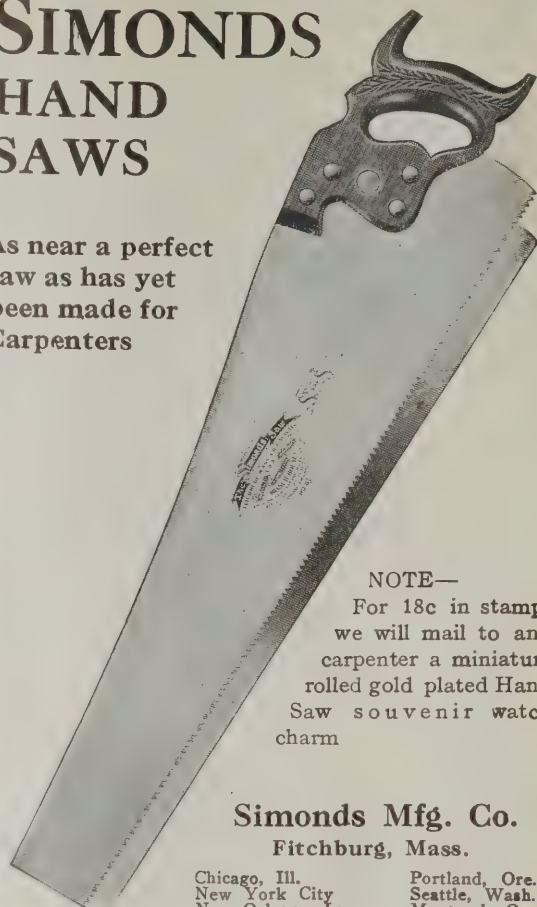
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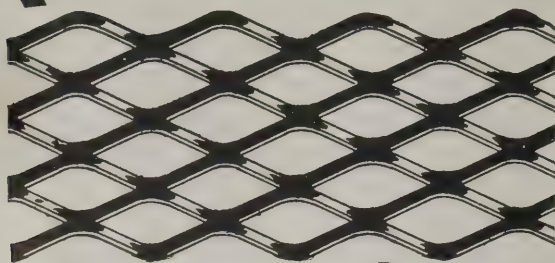
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by staples. Certain plates for corner adjustment have perforations where the metal is partly punched through. By this arrangement these corner plates are permitted to lap past, thereby making the equipment adjustable to build-ings and walls of various sizes and dimensions, no special size corner or filler plates being employed. Window and door frames are built out to the thickness of the wall, and dropped into the forms, a saw cut being made back of the frame into which is set a tin or galvanized iron strip; the concrete is poured about this, making a joint proof against air leakage which might afterward result from shrinkage of the wood frames. Where interior furring is desired, wood blocks with a nail projecting downward are dropped into the concrete at the end of the day's pouring. To these blocks vertical furring strips are afterwards attached. The steel form plates are of $\frac{1}{8}$ inch thickness, pressed into flange sections 2 ft. square; are practically indestructible, and can be used many times. These are thoroughly cleaned and oiled each time they are raised, which gives an extremely smooth finished surface. By this swing-arm system, an equipment for wall of any height need only be two tiers or 4 ft. in height, and the average cost for placing, removing and cleaning forms is reduced to $\frac{1}{2}$ c. per superficial foot of forming.

"Red Devil" Chain Drills

A chain which "holds the drilling tool to its work," is the essential feature of the "Red Devil" chain drill, or "Portable Drill Press," as the maker terms it, in a recent letter which states that the demand for this tool throughout the country on the part of contractors and builders shows a decided increase during the past year. These appliances are made in nine different styles, both hand and automatic feed, are light in weight, and, when used in conjunction with any bit brace, are said to fill the place of small drill presses, as they can be used for drilling steel door casements, or any other hard material for which the ordinary brace and auger are not adapted. "Red Devil" Chain Drills are made by the Smith & Hemenway Company, 150 Chambers Street, New York City, to take any size standard bit or drill, of square or round shank.

Parks Improved Woodworking Machines

There has just been issued from the press by Parks Ball Bearing Machine Company, Station A, Cincinnati, O., what is known as Catalogue No. 7 illustrating and describing Parks Improved Single or Combination Woodworking Machines. For 25 years the company has been manufacturing woodworking machinery and the statement is made that in 1885 Mr. Parks introduced the first tenoning tool to be used in a mortising machine and patents issued in December, 1887, and July, 1888, covered the valuable features. The point is made that every design of machine offered has been worked out on the basis of practical experience, being first put into actual use in the workshop before it was placed on the market. The single machines are so designed and arranged that others can be added to as needed by the woodworker and thus build up a most elaborate combination of machines.

The catalogue consists of 64 pages of profusely illustrated letter press showing a number of new machines which have been added to the company's already extensive assortment. Prominent among this list brief mention may be made of the single table circular saw with 6 in. jointer and with jig saw, sand disk and boring attachment; the 22-in. band saw with 6- or 12-in. jointer, edge molding and rim rounding attachments, and swing cut-off saw No. 427.

The illustrations show the outfit just as it is furnished with the company's double table circular saw machines. A large friction wheel goes on the countershaft and the bases of the swing cut-off and rip saw are made in one piece. The swing cut-off saw can be run from the same countershaft that is operating other machinery. The machines illustrated and described cover a wide range and are adapted to meet all reasonable requirements of the woodworker. Space in the catalogue is also devoted to a large number of attachments for executing different kinds of work, countershafting machinery wheels and a repair list which will be found of special convenience. A number of suggestions regarding the selection of machines and attachments is not the least important feature of the catalogue under review. Emphasis is laid upon the advantages of ball bearings in connection with foot and hand power machines and to the fact that the balls used in the bearings are guaranteed to be of the best grade and run on steel races hardened and ground.

A Hydraulic Vacuum Cleaner

A vacuum cleaner which is designed to operate on ordinary city water pressure, has been placed on the market

(Continued on page 46)

Thomas Morton

245 Centre Street
NEW YORK

Copper Cable
Steel Cable
Champion Metal
Steel Champion

SASH CHAINS

CHAINS

For Suspending Heavy Doors,
Gates, Etc.

All of SUPERIOR QUALITY



The Smith & Egge Mfg. Co.

BRIDGEPORT, CONN.

Sash Chains



Cable Chains



Jack Chains

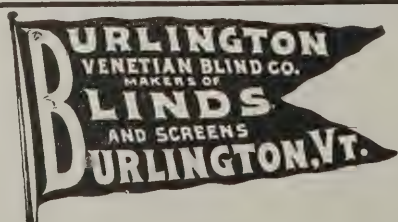


Manufacturers of "GIANT METAL" Sash Chains

Manufacturers of "RED METAL" Sash Chains
Cable Chains, Jack Chains, Bell Hangers' Chains and
Plumbers' Chains. Made in Brass, Copper and Steel.

WRITE FOR CATALOGUES AND PRICES.

We are the ORIGINATORS of SASH CHAIN as
SUBSTITUTE for sash cord. In use over thirty
years. Capacity of our chain plant 30 miles per day.





No. 500
with
2 Jaw Chuck
New

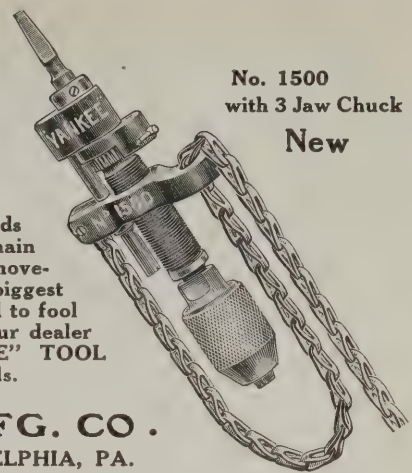
Are You Looking
for a Chain Drill?

Here's the "YANKEE"

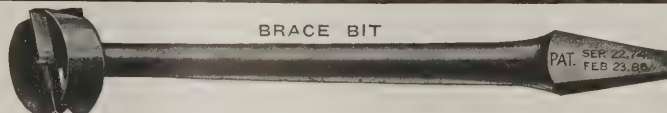
With Positive Automatic Feed

Adjusts itself to the size drill point used, and feeds no faster than it can take. The slack in the chain is quickly taken up by the automatic friction movement, giving you the quickest operating and biggest time saving Chain Drill made. No hand feed to fool with, to catch and pinch the fingers. Your dealer can supply you. Send for "YANKEE" TOOL BOOK—FREE—Tells more about Tools.

NORTH BROS. MFG. CO.
LEHIGH AVENUE, PHILADELPHIA, PA.



No. 1500
with 3 Jaw Chuck
New

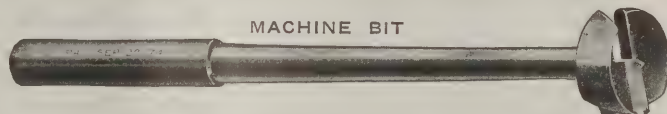


BRACE BIT

Bores any Arc of a Circle

Is guided by its circular rim instead of its center, and can be guided in any direction, regardless of grain or knots, leaving a true polished surface. Will bore a square hole. Unequalled for core boxes, delicate patterns, veneers, screen work, scalloping, newels, ribbon moulding and mortising.

THE PROGRESSIVE MFG. CO., Dept. "A" Torrington, Conn.

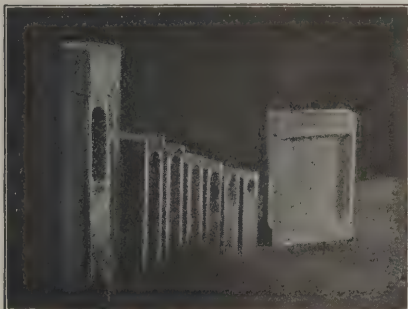


MACHINE BIT

The Improved Perfection Mortiser

Any size, 6 1/4 Inches to a round hole

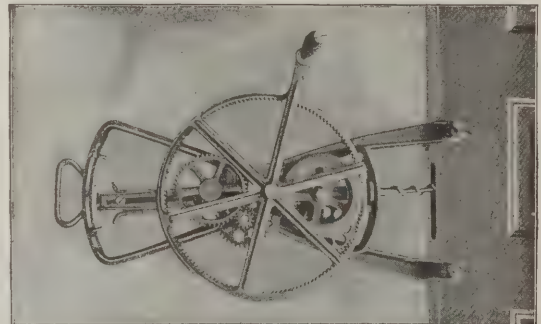
Bit moves up and down while boring



Cuts mortise perfectly true and clean. Straight in at top and bottom, with straight back wall.

positively makes complete a mortise for locks, doing the work from start to finish. No other tools required.

The only tool of its kind.



Perfection Mortise Machine Co., Columbus, Ohio

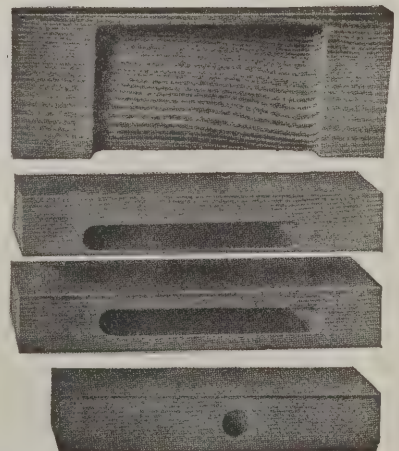
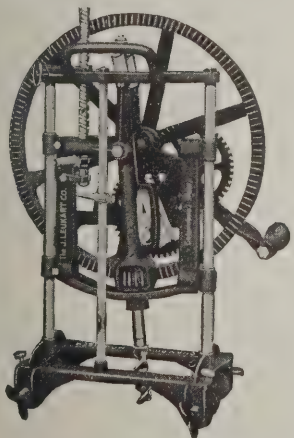
The Champion Mortiser

Let us send you on trial the only machine that will mortise hard, soft or knotty wood, through dowel pins or panel ends, with or against the grain, all with perfect ease—The Champion Mortiser. It cuts a complete and perfect mortise without use of brace and bit or any other tool.

The Champion is absolutely accurate and is adjustable from a round hole to a 6" slot. Simple to operate and will last a life-time. Write for trial offer and descriptive circular.

THE J. LEUKART CO.

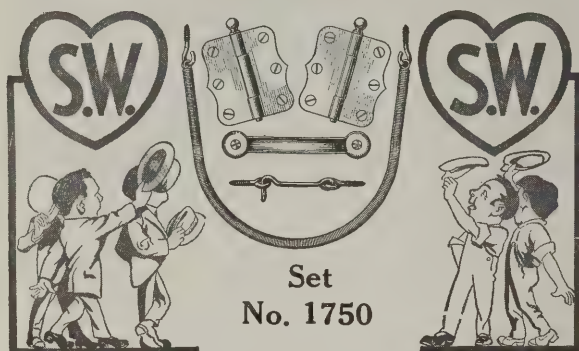
32-40 East Columbus St., Columbus, Ohio.



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STANLEY'S

Wrought Steel Screen Door Hardware



Each Set Complete with Screws Ready to go on the Screen Door

Owners and Builders alike are pleased with the high quality of the hardware and the convenient way it is packed ready for use.

Butts, pull, spring, hook and eye, and screws, all of the highest quality of material and workmanship.

They can be furnished in Japan, Antique Copper, Brass, or the "Stanley" Sherardized rust-proof finish, the proper finish for outside doors.

Write us for Circular "E"—it tells the story.

THE STANLEY WORKS

New York New Britain, Conn. Chicago

"Bridgeport Standard"

Wood Finishes Are Selected When Reputation is at Stake.



**THIS BOOK
About Wood Finishes
GIVEN AWAY**

Read carefully this letter from the firm that did the wood finishing for the LARGEST HOTEL IN THE WORLD and remember that the best in wood finishes—"Bridgeport Standard"—is the only kind to use for your houses and your reputation's sake.

New York, Apr. 12, 1912.

The Bridgeport Wood Finishing Co., New Milford, Conn.

Gentlemen:—In finishing the woodwork in the new "Hotel McAlpin," it was our firm determination to produce an exceptionally fine piece of work, and we can safely say that we have exceeded our expectations. The credit is, largely due to the use of your special "Fireproof Mahogany Stain" and "Wheeler's Filler."

As you are aware, the birch woodwork used in this hotel has been fireproofed with silicate of soda, and is at best a treacherous material to produce a good finish on.

We had many flattering offers to use other stains and fillers on the market for this specific job, but knew that no ordinary stain and filler would do. Our experience has taught us that the use of "Bridgeport Standard Products" relieves us of all anxiety. In producing our work we use the best, the most reliable materials the market affords. The proof of this is in the finished wood of the "Hotel McAlpin."

Yours very truly,

230-234 E. 37th Street. CHARLES GRIMMER & SON.

No matter how much you know about wood finishing, this book—"Modern Wood Finishing"—will add something to your store of knowledge. This book embodies the combined experience of a corps of experts.

"Modern Wood Finishing" tells you all. Send for it—at once.

Your name and address on a postal card will bring our book "Modern Wood Finishing" to your desk.

Bridgeport Wood Finishing Co., New Milford, Conn.
New York Boston Chicago

by the Hydro-Vacuum Cleaner Company, 879 Niagara street, Buffalo, N. Y. The device consists of a turbine motor connected to two diaphragm pumps, and a mixing chamber in which the dust is combined with water before being discharged into the sewer. The casings and tools are made of aluminum, the bearings and crankshaft of tool steel. The motor and pumps are placed in the basement of the house and connected to a suction pipe which runs to the upper floors. On each floor is a connection box to which the vacuum hose is attached, and provision is also made for a piping system to permit the water to be controlled from any desired point.

The plant is designed for installation by plumbers and steam fitters, the piping to be furnished by the latter.

A 22-page booklet issued by the company contains detailed instructions for installation of the apparatus. Diagrams are included, showing methods of boring holes and running leads of pipe in completed dwellings, and the services of the company's engineering department are extended, in cases where the directions are not fully understood or where special problems of installation are encountered.

Low cost of operation is one of the chief claims made, and attention is called to the conveyance of dirt directly to the sewer, without the necessity of preliminary handling.

Cutting Cope Grooves for Sash Joints

In placing orders for special saws to be used in the grooving of sash members it is necessary that the company to which the order is sent be furnished with exact dimensions of the grooves to be cut by the saw desired. Huther Bros. Saw Mfg. Company, Rochester, N. Y., calls attention to the fact that a great many readers of *The Building Age* do not make themselves clear on this point. As a help in this matter the company has prepared a blue print upon which may be entered such dimensions as will make possible the filling of the order exactly. Copies of this blue print will be sent by the company to any person who mentions *Building Age* in his letter of application.

Catalogue of Builders' Materials

The Huber Builders Material Company, 48 to 50 Vine Street, Cincinnati, O., has just issued a finely illustrated catalogue containing about everything in the line of builders' materials that would be of interest to the carpenter-contractor. The company specializes in building materials including millwork, mantels, porch work, grates and fireplace fittings for every class of building, and by having at all times a large stock on hand is prepared to ship goods at short notice. The company seeks the business of carpenter-contractors through its direct selling method and is thoroughly familiar as the result of long training and experience with their requirements, quality of goods and character of service necessary to establish permanent buying and selling relations. The Huber idea is to give buyers what they want, when they want it, and at the right price. The catalogue which has been issued is arranged in attractive style and a copy can be secured free of charge by any carpenter or builder by sending to the address above given.

Detroit Storm Tests Store Fronts

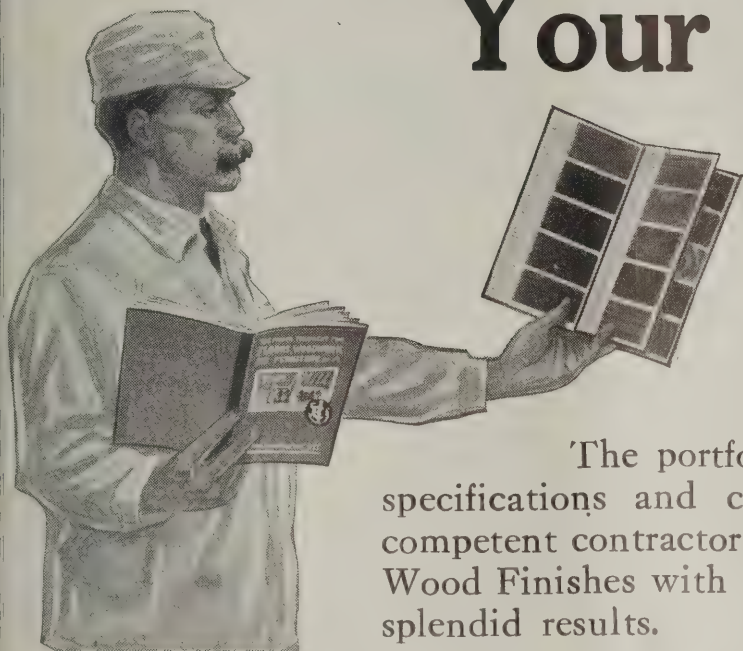
On Friday, March 21st, Detroit was visited by the most severe wind storm in the history of the city. The gale reached a velocity of 86 miles an hour and in some parts of the country would be considered a hurricane. In every part of the city signs were torn from their fastenings, chimneys were knocked over and in the downtown district the big plate glass fronts began to fail under the pressure and were crashing on every side.

An interesting result of the storm has just been brought to the attention of the Detroit Show Case Company, who manufacture the Petz Bars for store front construction. On investigation they found that, although there is a widespread use of their bar throughout their home city, there was not a single instance in which glass set in Petz Bars had been broken. In Siegel's and Owens' big fronts, which show the largest and most extensive plate glass frontage in the city, the glass held perfectly against the terrific wind pressure.

The Detroit Show Case Company are particularly pleased by the record made by their bar, inasmuch as it was frequently shown that other styles of store fronts in the immediate vicinity to their own failed to stand the pressure. It was a particularly strenuous test and the makers of Petz Bars are to be congratulated on the wonderful showing.

(Continued on page 48)

This \$1.00 Portfolio is FREE And You Need it in Your Business



EVERY up-to-date, wide awake contractor should have this Portfolio of Wood Panels. It shows the Johnson Finishes on oak, maple, birch, chestnut, pine, etc.

The portfolio gives full instructions, specifications and covering capacities. Any competent contractor can use Johnson's Artistic Wood Finishes with the minimum of labor and splendid results.

Johnson's Wood Dye

In 17 beautiful and harmonious shades such as Early English, Mission Oak, Three Shades of Mahogany, Flemish Oak, etc.

This Dye has nothing in common with the ordinary stain. It gives an artistic *natural* shade in just the tone desired—and does not raise the grain. Dries in 30 minutes.

Johnson's Flat Wood Finish

This easy-spreading liquid is made especially to enable you to get hand-rubbed effects with little labor and with extra profit.

S. C. Johnson & Son, Racine, Wisconsin

"The Wood Finishing Authorities"

\$1.25

\$1.25

Mr. Contractor: Upon receipt of this coupon, filled out by you, we will send you free and postpaid

1—\$1.00 Portfolio of Wood Panels.

1—25c. Book, "The Proper Treatment for Floors, Woodwork and Furniture."

S. C. Johnson & Son, "Wood Finishing Authorities," Racine, Wis.

Name..... Address.....

City and State.....

I buy my paints of.....

B.A. 5

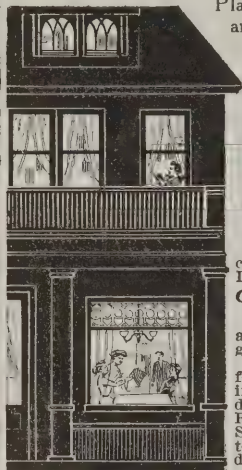
Please quote BUILDING AGE when writing to advertisers.

\$ QUICK SALES LARGE PROFITS \$

Building Contractors

are making large profits selling the **Detroit Combination Gas Machine** to farmers and others located where city gas is not available.

You make a big Profit on the sale of the Plant, another Profit on the installation and sale of appliances—**Three Profits in One Deal.**



DETROIT Combination Gas Machine
FOR LIGHTING AND COOKING

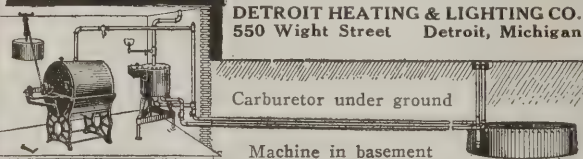
if you are not already selling this machine, it will pay you to start at once. It makes the cheapest—

Gas for Lighting—Gas for Cooking Gas for Laundry—Power Purposes

and for all other uses common to city gas at just as cheap or cheaper cost.

These plants have been the standard for over 44 years. Perfectly safe, entered in Class A National Board of Fire Underwriters. More than 20,000 in use in Residences, Stores, Factories, Churches, Schools, Villages and Hospitals. Write today for complete information and dealers' terms.

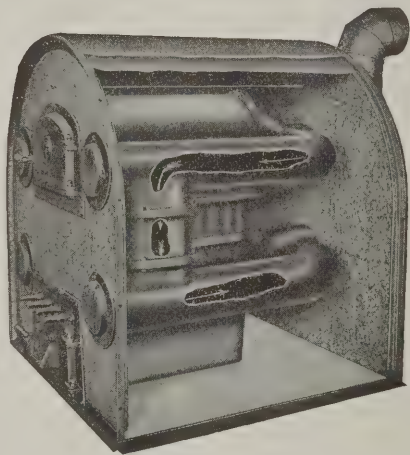
DETROIT HEATING & LIGHTING CO.
550 Wight Street Detroit, Michigan



Carburetor under ground

Machine in basement

EFFICIENT HEATING



BRIEN HEATERS

GIVE A LIFE TIME OF SATISFACTORY SERVICE

Built of the best materials throughout, they are of a design that is as far ahead of all other furnaces, as it is different.

Let us estimate without obligation to you a scientifically correct heating plan for your home. Send to-day for our catalogue and give us the measurements of your house.

The Hottest Thing On Earth

BRIEN HEATER CO. Westfield, Mass.

Some New Designs of Grille Work

There has just been issued from the press by the Chicago Grille Works, 828 to 838 Wells Street, Chicago, Ill., a 56 page catalogue profusely illustrated and bound in red paper covers showing many new and attractive designs in grilles, parlor columns, colonnade openings, consols and sideboards. The company states that for 21 years in its present location it has satisfied customers from Maine to California. All of the work turned out by this enterprising concern is made from kiln dried lumber, and the statement is offered that it should be filled or varnished immediately upon receipt of shipment in order to prevent the wood from swelling. It is also suggested that customers order by numbers and give the width of opening and height as well as the size of jamb.

The designs presented cover a wide range and are adapted to meet all reasonable requirements. In connection with each design is given its number, dimensions and other information likely to be found valuable in this



Fig. 14—Arts and Crafts Design for Opening 6 Ft. or More in Width

connection. The illustrations are of such a nature as to afford an excellent idea of the work turned out. Among the closing pages is a price list with the design numbers arranged in numerical order.

In Fig. 14 of the accompanying engravings we show an example of work turned out by this concern representing a colonnade treatment for openings 6 ft. or more in width. The columns are square, as are also the spindles in the short balustrade at right and left of the opening.

Bishopric "Stucco-Board" for Stucco or Plaster Work

What is said to be the latest material on the market for use in connection with concrete and stucco houses is "Stucco-Board," which is nailed to the outside studding and is so constructed as to firmly grip the cement at all points and prevent a waste of material. Stucco-Board was originated by Allison Bishopric, president and general manager of the Mastic Wall Board & Roofing Company, 376 Este Avenue, Cincinnati, Ohio, and is now being marketed by that concern. In order to demonstrate his ideas, Mr. Bishopric took some of the wall board and nailed it to studs wrong side out. Then he plastered the wall so constructed with cement and gave it a stucco finish. He was surprised to find that the wall was finished with very much less than the amount of cement usually required for such an area. He allowed the job to stand in the weather for a year in order to give it a thorough trying out. After hardening, the test wall proved so stiff and gave such an attractive appearance that Mr. Bishopric decided to make and market a background for the use of contractors and builders in the erection of stucco houses. He had lath prepared with specially designed grooves and these were embedded in toughened Asphalt-Mastic under heavy pressure. The product was then cut up into sheets. Samples of the material were then sent to a number of contractors for use in building stucco houses and the results were so satisfactory that the new material was named "Bishopric Stucco Board," and patents protecting it from imitation were taken out.

The Asphalt-Mastic composition is a moisture-proof, fire-resisting material which is claimed to keep out the

(Continued on page 50)



The Langdon Acme Mitre Box

This is the Mitre Box, the accuracy of which we guarantee when equipped with saws fitted by us.

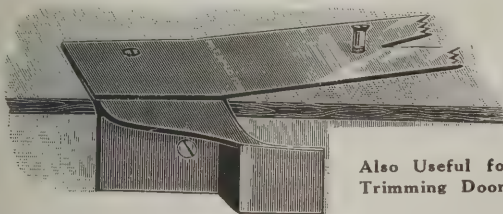
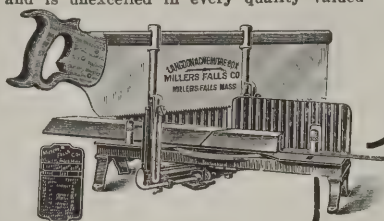
Instantly adjustable to any angle, and made with extra long saw guides that insure steadiness and accuracy. Saw supports have automatic catch for suspending saw and locking lever for securing saw at any required angle.

Made in three sizes for saws ranging from 22" to 30". This Mitre Box is the product of our long experience in making mitre boxes, and is unexcelled in every quality valued by practical men.

Ask us for details and prices.

Millers Falls Company

28 Warren St.
New York.



Also Useful for
Trimming Doors

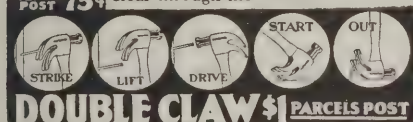
Send 50c. for This Bench Hook Combination

The handiest little tool ever made is Whipple's Carpenter Combination Bench Hook. Quickly adjusted to a temporary bench. The Hook is made of malleable iron and steel. Sent postpaid on receipt of price.

A. I. POTTER Box 176 Springfield, Mass.



ORDER THE "HYNAILER" 75c
Best single claw hammer ever made. Holds the nail for high, low or far across driving. Grips plain part of nail so strongly as to pull the head of nail clear through the wood.



DOUBLE CLAW \$1 PARCELS POST
ORDER THE "DOUBLE CLAW" \$1
Best Hammer ever made. Holds the nail for starting to drive where you can not reach with two hands. Pulls the nail out straight without a block.

DOUBLE CLAW HAMMER CO.
453 BROADWAY, BROOKLYN, N. Y.

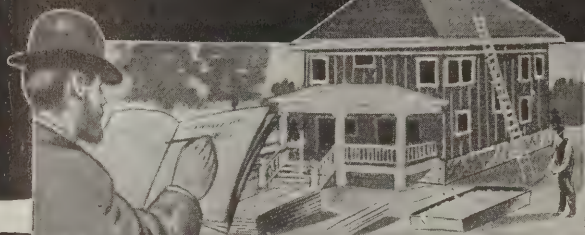
Antiques of all Sorts

Send 4 cents for Catalog and Lists of Antiques—Rugs—Gifts. I ransack 1,000 attics annually. My stock is replete with fine Old Things from New England Homes.

HAND MADE RUGS
Braided, Woven, Drawn-hooked Rag Carpet. Old Chintz, Patch Work.

RALPH WARREN BURNHAM
IPSWICH IN MASSACHUSETTS

Big Savings For Contractors and Builders— Buy Direct From Us at Wholesale Prices



HERE'S the finest chance Carpenters, Contractors and Builders ever had to get their building material, lumber and millwork at *less than wholesale prices!* We ship everything for building direct to *You*, guarantee all goods to be absolutely new (no wreckage) and guarantee also safe delivery and perfect satisfaction. Send today for our brand new 176-page catalog of Millwork and Building Material. It contains 3,000 superb illustrations and 8,000 bargains for you to save money on. Get our magnificent Book of Modern House Plans also. Shows you how to build and save 33% to 50% on everything. We ship you lumber, flooring, doors, windows, mouldings, porchwork, building paper, hardware, tinwork and roofing. Note the few bargains listed below.

H. H. Munger

President.

Porch Post

CLEAR FIR
4 x 4
8 Feet
55c

100 feet of Quarter Round, Dealer's Price \$1.00 — our price only **30c**

Glazed Windows of all kinds ready for quick shipment.
2 light 68c up
4 light 77c up
12 light 83c up

1 light Stall Sash **34c**
4 light Barn Sash **47c**

Porch Spindles
1 1/2c

Hardware

8000
Price-Saving Bargains

Get Our Two Free Books Today

Fir Porch Newel
4 x 4
4 Feet
33c

Wearwell Paint

Perfect guaranteed house paint—Single



\$1.20 per gal. in 5 gal. kit. We have all kinds of paint at wholesale prices. All kinds of building hardware. You can't beat our goods or our whole sale prices.



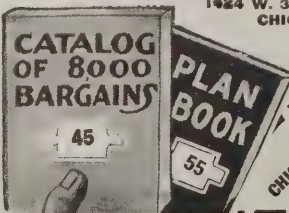
\$838 We will furnish complete all lumber, millwork, hardware, spouting, paint—everything except masonry and labor to build 7-room house. Plans free. Allis.

—whether you build now or not. Think of the actual savings, the high quality of all our goods, our binding guarantee of satisfaction and safe delivery. Fill in this coupon right now—mail it at once!

CHICAGO MILLWORK SUPPLY CO.
1424 W. 37th Street
CHICAGO

176-Page Catalog and Book of Plans Mailed You FREE!

Write today for these books. You need them savings, the high quality of all our goods, our binding guarantee of satisfaction and safe delivery. Fill in this coupon right now—mail it at once!



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Gentlemen—Please send your FREE books listed below, to
Name..... Address.....
Date.....
Catalog No. 45 of Building Material
PLAN BOOK No. 55 House and Barn Plans



EDGE TOOLS

We don't have to tell you about the quality of these, for you already know.

If you don't know where to get them in your town, write us and we will tell you, and tell you what they will cost.

If your dealers do not have them and will not order them for you, we will sell them to you direct.

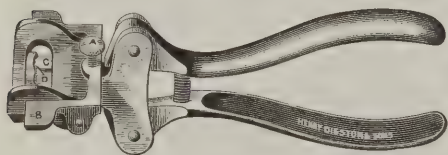
Write us for illustrations and prices.

Insist upon the best—Get WHITE'S

THE L. & I. J. WHITE COMPANY

No. 100 Perry St., Buffalo, N. Y.

Disston "Triumph" Saw Set



**Quick
Powerful
Practical**

This has proven to be the best and most practical Hand Set ever placed on the market.

An important feature is the use of two plungers operated by the two levers, or handles; pressure on the lower lever forcing plunger *D* against the body of the saw, thus holding it rigidly in position and preventing slipping, while a continuation of the pressure on the upper lever operates plunger *C* in setting the tooth.

In action, it is easy and powerful, and while it will perfectly set wide and heavy saws, it is also particularly adapted for narrow blades. If the gauge *B* is properly adjusted, the result will be a uniformity of set that cannot be obtained by any other Hand Set.

Another important advantage is the open head, enabling the operator quickly to adjust the Saw Set to the tooth, the work being in plain view at all times. The gauge *B*, for regulating depth of set, has a wider bearing than in most Saw Sets, thereby doing away with the tendency to incline the tool to one side or the other, which would give an uneven set to the teeth. The anvil *E* is fitted with four beveled surfaces, suitable for different sizes of teeth.

Made in three sizes, Nos. 8, 18 and 28. We also make this set in the No. 280 pattern, it being fitted with smaller plunger, setting the smaller, or finer, sizes of teeth.

HENRY DISSTON & SONS,
INCORPORATED

KEYSTONE SAW, TOOL, STEEL AND FILE WORKS
PHILADELPHIA, PA.

ESTABLISHED
1840

natural dampness of concrete. It is also referred to as a non-conductor of heat and cold, and a thin concrete wall backed with Bishopric Stucco-Board is said to keep a house warmer in winter and cooler in summer than would otherwise be the case.

The lath construction of the product forms a "key" that firmly grips the cement. The Stucco-Board is referred to as a big saver of time, labor and money. It is furnished in sheets 4 ft. square to meet the requirements of standard sized studs placed 16 in. on centers. It is, however, equally well adapted to 12 and 24 in. centers. The material is quite easily applied and in most cases is put on by lathers or carpenters apprentices. It is nailed in sheets to the studs and the walls are at once ready for the cement. A hammer, nails and a hand saw are all the tools that are required in applying the material. Some builders have found Stucco-Board a money saver for interior work and are using it instead of lath. They claim that it makes a more enduring wall with a less amount of plaster and prevents the latter from dropping from the ceiling under vibration. A booklet on Mastic products, and which tells all about the new Bishopric Stucco-Board, has just been issued by the company and a copy of it will be sent free to any builder or carpenter who will write for it.

Samples of Woods Treated with Johnson's Artistic Finishes

One of the most striking methods of bringing to the attention of architects, builders, painters, house owners, etc., the artistic effects which may be produced by the use of Johnson's wood finishes is the port-folio of wood panels which reaches us from S. C. Johnson & Son, Racine, Wis. It consists of a book measuring 5½ in. wide by 10¾ in. high and to the several pages of heavy cardboard are glued samples or panels of wood measuring 3½ in. long by 1¾ in. wide, each panel showing the effect produced by some one of the artistic wood finishes furnished by this concern. In all there are 25 wood panels and beside each is the name of the wood and the material with which it has been treated. The panels clearly show the natural grain of the woods, also the effects produced by the use of Johnson's wood dyes, prepared wax, underlac and other finishes of the concern. Interspersed among the cardboard pages are others of ordinary paper, carrying a list of distributors of Johnson's products in the United States. These are arranged alphabetically by states and also by cities and in addition are the names of the concerns where the Johnson goods can be obtained. Accompanying the port-folio of wood panels which is sent free to painters, are several leaflets calling attention to the publication in question. S. C. Johnson & Son will also send to any reader who may be interested a booklet entitled "The Proper Treatment for Floors, Woodwork and Furniture." Ordinarily the price is 25 cents, but to any reader of *The Building Age* making application for it a copy will be sent free of charge.

Hercules Concrete Block Machines

The Century Cement Machine Company, Rochester, N. Y., is distributing among the trade a very attractive 24-page catalogue profusely illustrated with buildings of various kinds, in the construction of which Hercules blocks have been used. There are also half-tone engravings of Hercules machines and the blocks of various sizes and styles which may be produced therewith. The company has been making and marketing Hercules concrete block machines for more than nine years, and during that time the machines have found their way into all parts of the civilized world. The machines are said to be of such a nature as to enable operators to start in a small way and gradually add to their equipment without being compelled to be continually purchasing new machines. The Hercules are strong yet simple in construction and easy to operate. They are built at the company's own factory by skilled workmen and cannot get out of order. The catalogue under review briefly describes the latest Hercules machines and their product, but if there is any point which is not quite clear to the reader the company will appreciate the opportunity of making it plain by correspondence or otherwise.

New Headquarters of Yale & Towne Mfg. Company

The executive offices of the Yale & Towne Mfg. Company were transferred on April 18 from 9 Murray street, where they have been located for the past 15 years, to 9 East 40th street, New York City, where all correspondence should hereafter be addressed. The new location was selected after long and thorough investigation as the

(Continued on page 52)

Stanley
ToolsStanley
45SEVEN PLANES
IN ONE

This well known and very useful Plane has long been recognized by tool users in general, as a valuable addition to their Kit of Tools.

In a compact and practical form it combines **SEVEN PLANES IN ONE** as follows:—1. Beading and Center Beading Plane. 2. Plow. 3. Dado. 4. Rabbet and Filletster. 5. Match Plane. 6. Sash Plane. 7. Slitting Plane.

However, though combining only seven distinct types, it accommodates cutters of different widths, so that in reality, it replaces many more than just seven Planes.

Twenty-one separate cutters are furnished with each Plane, comprising ten Plow and Dado, seven Beading, one Filletster, one Sash, one Match and one Slitting Tool. Twenty-four additional cutters are regularly carried in stock.

All metal parts are heavily nickel plated and the handle, knob and fence are made of selected rosewood.

The Plane together with its twenty-one cutters weighs approximately 9½ lbs. and the entire outfit is packed in a handsome metal box.

FOR SALE BY ALL HARDWARE DEALERS.

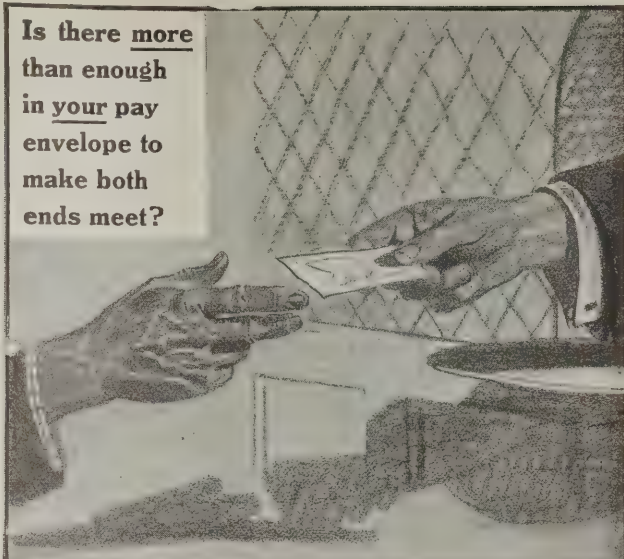
LIST PRICE, \$7.00.

An attractive twelve-page booklet explaining in detail the different uses to which **STANLEY "45"** may be put has just been published. May we send you one?

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

Stanley
Tools

Is there more
than enough
in your pay
envelope to
make both
ends meet?



Does Your Salary Grow With Your Needs?

You've GOT to earn more money.

The cost of living is increasing at the rate of 5 per cent. a year. Every prominent financial authority predicts a further increase. You've simply *GOT* to earn more money to offset this rise in the cost of the ordinary necessities of life.

Does **YOUR** salary meet your *present* needs? Will five or ten years, with their added responsibilities and increased expenses, find your income *more* than enough? How are **YOU** going to meet this problem?

For 21 years the International Correspondence Schools have been helping men to provide against the increased cost of living by training them for better jobs and bigger pay. *They can do the same for YOU.*

No matter what you do, where you live, how little spare time you have, or how meagre your education—if you can read and write and are ambitious, the I. C. S. can help you.

No obligation will be incurred by marking and mailing the coupon—it will simply enable the I. C. S. to tell you **HOW** they can help **YOU** into a better position. Don't fail to at least **INVESTIGATE** this opportunity.

Mark and Mail the Coupon TODAY

International Correspondence Schools

Box 969, SCRANTON, PA.

Please explain, without further obligation on my part, how I can qualify for a larger salary and advancement to the position, trade, or profession before which I have marked X.

Architect
Arch'l Draftsman
Contract'g & Build.
Building Inspector
Structural Eng.
Structural Draftsman
Plum. & Heat. Con.
Supt. of Plumbing
Foreman Steam Fit.
Plumbing Inspector
Heat. & Vent. Eng.

Estimating Clerk
Civil Engineer
Surveying
Mining Engineering
Mechanical Eng.
Mechanical Drafts'n
Stationary Eng.
Electrical Engineer
Electric Lighting
Electric Railways
Concrete Const'n

Automobile Runn'g
Foreman Machinist
Sh.-Met. Pat. Drafts.
Textile Manufact'g
Bookkeeper
Stenographer
Advertising Man
Window Trimming
Commerc'l Illustrat'g
Civ. Service Exams.
Chemist

Name _____
St. and No. _____
City _____ State _____
Present Occupation _____

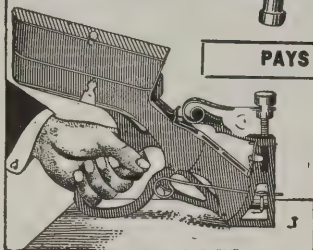
Pearson's Automatic Shingle Nailer

Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. Throw nails in by the handful—holds about 600 nails—start nailing. Nails can be driven through tin or quite heavy sheet iron.



Made in two sizes:
The BLUE Nailer for 3d common No. 14 gauge wire nails.

PAYS ITS COST ON ONE JOB



The RED Nailer for 3d galvanized No. 13 gauge 1 1/4-inch wire nails. Order through your dealer or sent prepaid for \$5.00.

Money refunded if not as represented

PEARSON MFG. CO.
Robbinsdale, Minn.

The Yankee (A Compound) Level

Just the thing for the Arch.-Builder
An accurate level for moderate cost



Runs Horizontal and Vertical Angles.

Sold guaranteed by
Frost-Adams Co.

37 Cornhill, Boston, Mass.

Write for latest catalogues.



HANNA QUALITY ENGINEERING INSTRUMENTS

BEST IN THE FIELD.

Reconnaissance Transit No. 50 shown herewith has compound socket. Graduations on solid silver. Lense system—the ACME of perfection. Send for catalog.

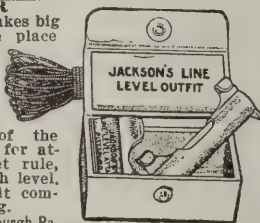
Transit No. 50
Price, \$115

THE HANNA MFG. CO., Troy, N. Y.

A UNIQUE TIME SAVER

The Jackson Aluminum Line Level makes big saving of time and labor. Takes the place of the old-fashioned sixteen foot straight edge. May be carried in vest pocket. No contractor, builder, carpenter, etc., can afford to be without. Stretch line and hang the level on it—It's positively accurate. Complete outfit goes into neat leatherette case and consists of the level with 40-ft. line also spring clamp for attaching level to steel square or pocket rule, thereby serving as a plumb rule or bench level. Ask your dealer or send \$1.00 for outfit complete post paid. Send for Tool Catalog.

J. Woodwell Co., Sole Agts., 201-203 Wood St., Pittsburgh, Pa.



one best suited to meet the convenience of the customers of the company and to promote efficiency of management.

The building is a 12-story structure covering a plot 30 x 100 ft. and has been carefully designed to meet the company's requirements. The entire ground floor is devoted to a series of exhibit rooms which will be completed about the first of July and will comprise a very extensive display of locks and builders' hardware, intended especially to serve the convenience of architects and their clients as well as customers generally of the company. In the basement is located the city salesroom and a large stock room, also the repair department. The twelfth floor is devoted to the executive offices and the directors' room. On the eleventh floor are the offices of the department managers and the treasurer, also the large clerical force required for the conduct of the business.

We understand that three of the lower floors will be rented to other parties for the present and until required for the company's own use. The company extends a cordial invitation to all its customers to visit the new location and avail themselves of the new and improved facilities which have been provided.

Book on Metal Statistics

A copy of the sixth annual edition of "Metal Statistics" is being distributed with the compliments of the Wheeling Corrugating Company, Wheeling, W. Va., among its customers. This is a book of 256 pages, 4 1/4 x 6 1/2 in., bound in cloth, and containing as its title would indicate, statistics on the production and prices of metals extending over several years. This includes the statistics on all metals in which the readers of this journal are interested, including copper, tin, lead, spelter, aluminum, antimony, pig iron, scrap, coke, sheets, tin plate and the like.

TRADE NOTES

Designs and color plans for the decoration of any home, store, office, or church will be supplied free of charge by the engineering department of the Alabastine company, Grand Rapids, Mich., to any dealer, architect, or builder who mentions *The Building Age* in his request, according to a recent statement made by that company. Free stencil designs will also be furnished on the same terms, together with a book of stencils and color plans. The company calls attention to the fact that its two products, Alabastine and Alabasco, the latter a waterproof form of the former, when used in connection with the stencils mentioned above, furnish a satisfactory means of artistic decoration for interiors which can profitably be brought to the attention of householders by the builder, architect, or decorator. The claim is made that a wall treated with Alabastine may be redecorated by simply applying the coat of new material over the old without the necessity of removing the old coat by washing. Alabastine is a water color, and the company recommends Alabasco, a waterproof material, wherever the Alabastine would be subject to finger marks or water splashes. Alabastine is applied with the usual 7 or 8-inch wall brush.

The Sidney Tool Company, Sidney, O., announces that the recent flood in Ohio did no damage to its plant, and that it is prepared to fill orders as promptly as usual, subject to slight delays in railroad service in some sections of the flooded region. This announcement was received too late for the April issue of *The Building Age*, and it is probable that all railroad traffic will have been resumed by the time the present issue reaches our readers and business will have regained its normal condition.

Some good points on the selection and use of paint are contained in a color card recently issued by the William Connors Paint Mfg. Company, Troy, N. Y. Attention is called to the fact that black is the strongest pigment, and that, of the primary colors, the strongest is yellow, next red and lastly blue. A general rule applicable to the American Seal paint manufactured by this company states that one gallon of the latter will cover 300 square feet of surface with two coats, or 500 square feet with one coat. Sixty shades of color are given, covering all of the usual requirements.

Illustrations of various structures in which the Van Guilder hollow wall system is employed, are presented in a circular accompanying Folder No. 9, just issued by the Van Guilder Hollow Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y. The structures illustrated range from residences and store buildings to silos and green houses. The folder discusses in detail the adaptability for the different types of structures, of the various machines and attachments manufactured by the

(Continued on page 54)

Straight-Grained cedar that cuts like cheese; smooth, tough, leads that make clean-cut, strong marks—that's Dixon's Carpenter Pencil. Send 16c for sample lot. No. 32-J.

JOSEPH DIXON CRUCIBLE COMPANY
JERSEY CITY, N. J.



No. 30. 30-inch Aluminum. 4 Plumbs. 2 Levels.

In Sand's Plumbs and Levels

There is Nothing to get out of Order

You don't know how handy an instrument Sand's Aluminum level really is till you have used one. Has all the advantages of the best levels made, with the disadvantages eliminated.

Strong, light, and can be used overhead or at your feet. Spirit glasses covered with plate glass, making them dust, dirt and water proof.

At your dealers or direct. \$4.00 for the 24" or \$4.50 for the 30" level, guaranteed, and all express charges prepaid. Write today.

J. SAND & SONS

1023 Rivard St.

Detroit, Mich.

No. 24. 24-inch Aluminum Reversible All-around.



SEND \$1.00
for this



remarkably handy tool

"The New Complete Saw Set"

embodying every practical, common-sense feature of all others, and these 2 features that no other saw set has: 1, adjustable side gauge to bring the point of each tooth under the anvil; 2, top clamp screw to regulate amount of set. Wearing surfaces made of hardened tool steel. Take advantage of the Parcels Post by sending \$1.00 for this attractive offer. We prepay postage.

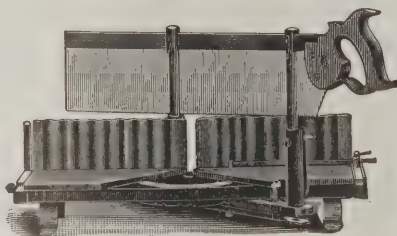
Otis A. Smith

Rockfall, Conn.

Goodell Mitre Box

Made of STEEL—Cannot Break

First in Quality and Improvements



Automatic Stops for holding up saw.

Corrugated Backs Graduated.

Gauge for Duplicate cuts and many other features.

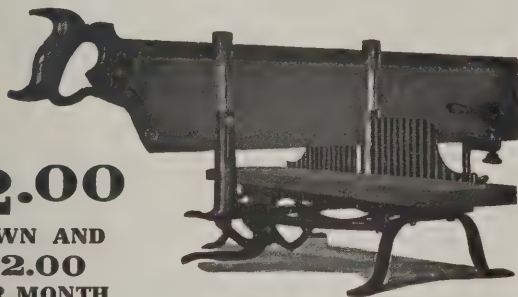
If you want the best you will take no other.

Send for Circular K.

GOODSELL MFG. Co., Greenfield, Mass.

\$2.00

DOWN AND \$2.00 PER MONTH

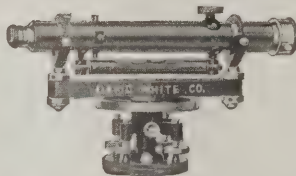


This is our easy payment plan. This Box formerly sold for \$12.50. Now \$8.95 cash—or \$10.00 on payments. These prices include saw. Every Box guaranteed to give satisfaction.

We sell direct to carpenters, giving you the benefit of the middle man's profits.

CROWN TOOL MFG. CO.,

Ottumwa, Iowa



Over 3000 in Use

THERE'S A REASON

White's

Improved Level

is especially designed for work where a general purpose level is required. Telescope is 12 inches long, with magnifying power 25 diameters and will detect an error of 1-16 inch in 300 feet.

Written guarantee with each instrument.

For further particulars and price ask for circular X.

David White Company

419 East Water St., Dept. B

Milwaukee, Wis.

MACK & CO.



The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

Brown's Race
Rochester, N.Y.



USE OUR

Folding and Adjustable Handle Draw Knife

It is adjustable to any position, adaptable to awkward places, absolutely rigid when set, handy and compact, a time-saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

WRITE FOR PRICES AND DISCOUNTS

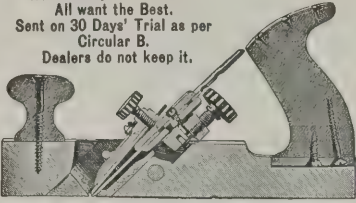
A. J. WILKINSON & CO., 180-188 Washington St., Boston, Mass.

INTRODUCTORY TRIAL OFFER

If the **SELF-SETTING PLANES** are not sold in your town and you write us saying "I saw your trial offer in Building Age," we will send you particularly, a carpenter's pencil and our \$1.00

THE BEST IS THE CHEAPEST

None Cheap but the Best.
All want the Best.
Sent on 30 Days' Trial as per
Circular B.
Dealers do not keep it.



Certificate, which we will receive as \$1.00 in payment for a **SELF-SETTING PLANE** as stated in our \$1.00 **Certificate**, and if this **S. S. Plane** is unsatisfactory and returned to us at our expense, we will send you \$1.00 more than you sent us, as the \$1.00 **Certificate** says.

As this paper guarantees we will do as our advertisement says, you know the plane must be **O. K.** **ALL WE ASK** is to have you **TRY** the **SELF-SETTING PLANE** on your own bench, in your own way, with or against the grain, on the **WORST** cross-grained, ealy, knurley, knotty, hard or soft wood you can find, **THAT IS FREE FROM SAND OR DIRT.** If it is not worth to **YOU, OR YOUR MEN, TWICE ITS COST**, return it at our expense as above stated.

If you send us the addresses of ten carpenters, no matter where they live, we will send you another hard, tough carpenter's pencil. Give the **SELF-SETTING PLANE** a chance to **PROVE ITS WORTH.** If it **FAILS**, return it and we will return your money. **GAGE TOOL CO., Vineland, N. J.**

Protection Brand Roofing

The Roofing without an Exposed Nail-head
Joints absolutely tight.



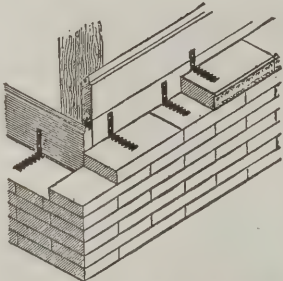
Practically
Fire-Proof

Reduces
Insurance

Send for
Book
Entitled

"A TIGHT
ROOF."

ASPHALT READY ROOFING CO.
9 CHURCH STREET NEW YORK



The Most Substantial

Walls are those built in which our **WHALEBONE WALL TIE** is used. Better than others' best.



Samples on request

ALLEGHENY STEEL BAND COMPANY
BELL PHONE: 718 Cedar North Side, PITTSBURGH

Parkhill's New Universal Pitch Gauge

marks more Roof-framing in less time than any other tool or method. More pitches—more framing for each pitch. All given by other tools, also both bevels on plancher, fascia, sheathing and purline; hip backing; octagon and irregular hips and jacks; hopper bevels, etc.

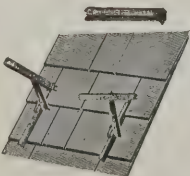
Gauge and directions are so simple, easy and exact that even the most unskilled framers can mark all cuts, lengths, etc.—22 for any one pitch of 100 in 5 minutes. Other tools use over 1000 figures, the Universal has 15 only. Fits any square. Unexcelled as stair and brace gauge. Prepaid for \$1.50. Money back if returned. Agents wanted.

John Parkhill, Rochester, Minnesota

SEND \$3.50 for a DOZEN of these ADJUSTABLE ROOF BRACKETS

or \$10 for 3 dozen. Do not confuse with cheap makeshifts. These are Best and strongest Brackets on market. Made of steel, fold to small space as shown at top of cut, and are adjustable to roofs of any pitch. Time and labor saved in short time will pay for Brackets, which once obtained will last a lifetime. Your money back if on delivery Brackets are not satisfactory.

W. S. GRISWOLD, 37 John St., Springfield, Mass.



company. The prices of the equipment are given. One of the special objects of "Folder No. 9" is to aid the builder and contractor in determining what machines and attachments are best for the work which he may be called upon to execute.

The Leader Iron Works, Decatur, Ill., has recently issued from the press an interesting catalogue illustrating and describing a full line of gas and gasoline engines, ranging from 1 to 22 h.p. A feature of the catalogue is the detail in which the various working parts and accessories are described and shown. Every one having occasion to make use of gas or gasoline power is likely to be interested in the information contained within the covers of this work and a copy can be procured by writing to the address given and mentioning *The Building Age*. The catalogue measures 6½ x 9½ in. in size, is printed on heavy glazed paper and bound in an embossed cover—black on maroon of the same shade in which the Leader product is finished.

A discussion of school building fires and their prevention is the leading article in the April Grinnell Automatic Sprinkler Bulletin, issued by the General Fire Extinguisher Company, Providence, R. I. Statistics are given of the fire loss of schools and colleges in recent years and a cut shows a test fire in a school-building which is said to have been extinguished in 60 seconds by the Grinnell sprinkler.

Niagara Falls Metal Stamping Works, makers of hardware specialties, Niagara Falls, N. Y., has just issued from the press the 1913 edition of its descriptive list No. 10. The cuts shown on the list embrace a large variety which are used by cities and municipalities such as street name signs, house numbers, vehicle license plates, dog tags and collars, bicycle tags, official badges, together with separate letters, figures, plates, etc. This is referred to as the most complete list of its kind the company has ever issued and a number of desirable patterns are here shown for the first time. A copy is mailed free to any one interested, also samples to those purchasing municipal supplies.

An interesting account of the method of making Cortright Metal Shingles is a feature of the last issue of the *Advocate* published by the Cortright Metal Roofing Company, 50 North 23d Street, Philadelphia, Pa. Another feature of this issue is found in the numerous letters from contractors and builders who refer in very flattering terms to the satisfaction which Cortright Metal Roofing has given. The season is at hand when many of our readers will be building new homes for themselves and they are naturally interested in the question of roofing. What the last issue of the *Advocate* has had to say about Cortright Metal Roofing cannot fail to appeal very strongly to them. A copy of the *Advocate* will be sent to any reader who may make application for it.

The DeWitt Wire Cloth Company, Belleville, N. J., has recently completed an addition to its plant consisting of a paint tower for expeditiously painting wire cloth.

J. W. Coulson & Co., 95 and 107 West Spring Street, Columbus, O., announces that although business in that city has been much affected by the recent floods, the company is in a position to fill with usual promptness all orders for its store front construction, as the factory and stock were located outside of the flooded district.

The little pamphlet entitled, "Fire, a Crime" issued by the Dahlstrom Metallic Door Company, Jamestown, N. Y., is being distributed among architects, builders and those engaged in the sheet metal business. It is not alone well calculated to suggest the use of metallic doors and metal trim for buildings, but also to encourage the selection of fireproof metal roofs, metal windows and other things which the contracting sheet metal worker can furnish with advantage to his pocketbook as well as to the owner of the buildings.

Illustrations of many different classes of structures recently erected in different parts of the country, all of which involved the use of Dixon products, are given in the April issue of *Graphite*, the trade organ of the Joseph Dixon Crucible Company, Jersey City, N. J. The leading picture shows the Hotel Oregon, the new million-and-a-quarter dollar structure recently erected in Portland, Ore.

R. Beard has just opened an office for the practice of architecture at 1414 Arch Street, Philadelphia, Pa., and would be glad to receive catalogues of manufacturers furnishing builders' appliances and equipment.

The Kinnear & Gage Mfg. Company, Columbus, O., in referring to the floods which recently visited that state with such disastrous results, points out that the reports giving the impression that manufacturing plants in the city were largely wiped out are generally exaggerated. The

(Continued on page 56)

Bigger Profits and Better Results with KNO-FUR METAL LATH



Metal Lath was used in this bungalow at Winchester, Mass. Cost \$2,400 complete, ready for occupancy.

Contractors and Builders! Our FREE Booklet on KNO-FUR LATH contains a lot of information that you ought to have on Metal Lath Construction. It tells why KNO-FUR LATH is more profitable to you, and more satisfactory to the owner, and gives many other reasons why it is superior to the old style methods. Send for Booklet 47 before you forget it.

KNO-FUR METAL LATH

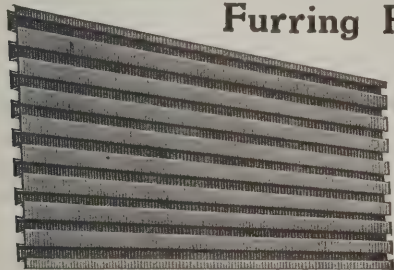
For outside use has a web-like mesh that completely imbeds itself in the plaster. The parallel ribs increase its strength and provide a substitute for furring. Its use eliminates sheathing, building paper and weather boards.

It is made from metal specially prepared to resist acid and rust. It is rigid and imperishable. KNO-BURN METAL LATH for inside walls and ceilings means no warping, cracking or buckling, and the plaster simply can't come off. FREE Booklet 43 tells all about it. Send for one.

We can ship KNO-FUR within 48 hours of receipt of your order

NORTHWESTERN EXPANDED METAL CO., 904 Old Colony Bldg., CHICAGO

Berger's *Ferro-Lithic* Reinforcing and Furring Plate



Write
for
Catalog

THE BERGER MFG. CO. CANTON, OHIO
For the best service address nearest branch.
New York Boston Minneapolis
St. Louis San Francisco Philadelphia

NIAGARA JUNIOR WALL PLUGS



For Building into Walls
of Brick, Stone or Concrete
As a Base for Nailing

Galvanized to Prevent Rust
and to Insure their Continuous
Usefulness

These Plugs can be put in place in one tenth the time it takes to dig out mortar and drive in a wooden plug, and are fourfold more secure. Every architect should put them in his specifications.

Ask for
Folder
57-A

SAMPLES ON REQUEST

NIAGARA FALLS METAL STAMPING WORKS

Manufacturers of Hardware Specialties
Niagara, Falls, N. Y., U. S. A.

S-23

**Joist Hangers
Post Caps
Iron Fencing**

The Van Dorn
IRON WORKS CO.
CLEVELAND, O.

**Jail Cells
Structural Steel and
Ornamental Iron Work**

We Are the Headquarters for Books on

All Branches of the Building Trades.
New Catalogue of live, up-to-date
books sent free on request.

Building Age Book Dept. New York
239 WEST 39TH STREET

Concrete Marble Processes

Shop Licenses or Exclusive Territory
For Sale

For literature, address

ART STONE COMPANY
WAYNESBORO, PA.

BOX 500

A Slate Roof

is needed only Once. Supply the need Now and your roof question is settled permanently. The service of all man made roofings is but temporary and future expense of up-keep almost endless. All metal and asbestos substitutes for SLATE are mechanical in effect and bound to prove a disappointment.

SHELDON'S SLATES

guarantee the most economical and durable roof possible to obtain. They are cleft from Natural colored rock, Red, Green, Purple, Black, into thirty sizes, ranging from 10" x 6" to 26" x 14". Storm, Wind and Fire Proof. Reduce insurance. Distinctively artistic. Weight no disadvantage. SHELDON'S SLATES are home beautifiers. The crowning protection without and within. A never failing source of satisfaction as long as your building stands. Our booklet, The Reason Why, tells every reason why SHELDON'S SLATES ON YOUR ROOF WILL PUT DOLLARS IN YOUR POCKET. Where shall we send your copy?

F. C. SHELDON SLATE CO.,

Manufacturers,
GRANVILLE, N. Y.

ROOFING SLATE

Sea Green, Purple Vein, Genuine Bangor, All Grades

There will be a big demand in every locality in spring for Slate Roofing. Get in shape to handle the business Now. Write Today for our delivered prices on all grades of Slate, Slater's Tools and Supplies, and the Lightning Slate Dresser. Full instructions about laying furnished free to new men. We are the Oldest and Largest Roofing Slate Concern in the U. S. operating 3 large quarries at Poultney, Vt. and 1 at Bangor, Penna. Orders filled promptly with choice stock. References—any bank in Cleveland. DON'T DELAY—WRITE TODAY—NOW.

THE AULD & CONGER CO.
1200 Prospect St. Cleveland, Ohio

Producers of
Roofing Slate
SLATE BLACKBOARDS

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facts are that but few, if any, Columbus manufacturers have suffered serious loss or delay except as they are affected by the interruptions in railroad shipments. The floods, while destructive, were confined largely to the residence section on the west side of the city, and by the time this issue of the paper reaches our readers, normal conditions will probably prevail.

"How a Wood Shop Was Rearranged" is the title of the leading article in the April issue of "The 'Lightning' Line," published by the J. A. Fay & Egan Company, 221 to 241 West Front Street, Cincinnati, O. The article is illustrated with a diagram showing how a judicious placing of "Lightning" line wood-working machinery in a jobbing shop resulted in a reduced operating cost.

The April issue of the *Universal Bulletin* which is issued by the Universal Portland Cement Company, 72 West Adams Street, Chicago, Ill., and which is distributed free of charge among those who desire copies contains the usual amount of interesting matter relative to concrete construction and the use of cement in connection therewith. The principal articles in this issue bear the titles of the "True Decoration of Concrete Buildings"; "Concrete Pavements Satisfactory in the Northwest"; "Concrete in a Radiator Plant"; "Portland Cement Stucco an Aid to the Architect"; "A \$3,000,000 Hospital at Cincinnati"; "A Church of Stucco Exterior," and the "Modern Schoolhouse Must be Fireproof." There is also a list of the literature issued for free distribution by the company which is of special interest to architects, building contractors and the owners.

Thorp Fireproof Door Company, Minneapolis, Minn., directs attention to the fact that in the construction of its fireproof doors the three-ply wood core is lined with heavy sheet asbestos and the wood and asbestos is then covered with 24-gauge sheet steel locked by the patent process. The sheet steel is then heavily copper-plated to give it an attractive appearance and to prevent any damage from rust. In cases where it is desired to preserve the harmony of interior finish the doors are grained to match the woodwork.

Berger Mfg. Company, Canton, O., has lately brought out a pump which is said to entirely overcome the troubles from freezing and rusting. It is not recommended for wells of over 30 ft. in depth, but for lesser depths the corrugated construction cares for all expansion and contraction due to changes of temperature. These pumps are made of No. 20-gauge galvanized open-hearth steel, the heavy galvanized coating inside and out making it impossible for the pump to rust, discolor or taint the water.

Expanded Metal for all Purposes is the subject matter of a bulletin just issued by the North Western Expanded Metal Company, 904 Old Colony Building, Chicago, Ill. The illustrations show actual size several of the styles of expanded metal used for concrete reinforcing, these being accompanied by descriptive data, stock sizes, weights, etc. There are also illustrations of the "Kno-Burn" XX Century expanded metal plastering lath, also of the "Kno-Fur" metal lath, and of the "Diamond-Mesh" metal lath, the latter being intended for reinforcing burial vaults, and for screens.

Best Brothers Keene's Cement Company has moved its Chicago office to the First National Bank Building on old office and one which affords better facilities for the conduct of the company's increasing business.

The Sandusky Portland Cement Company, Sandusky, Ohio, is out with a new booklet on Medusa White Portland Cement of particular interest on account of the illustrations which it contains of recent work of some of the leading architects of the country and giving many instances wherein Medusa White Portland Stainless Cement was used.

It is interesting in connection with the review of the catalogue of "Art-Kraft" metal products, which appeared in our last issue, to note that their originator was C. A. Weirich, treasurer and general manager of the Canton Metal Ceiling Company, 1946 Harrison avenue, Canton, Ohio. Mr. Weirich has been identified with the sheet metal industry for a great many years, and it is largely due to his long training and experience that the company has enjoyed such remarkable success from the very start. The Art-Kraft metal ceiling designs are exceedingly well adapted for wall and ceiling decoration and they are of such a nature as to make it possible to have distinctive artistic effects for the home, store or office. A copy of the catalogue reviewed last month, as well as of one devoted to Metal Tile and Shingle Roofs, can be obtained by any reader of *The Building Age* by sending his name and address to the company.

B

◆ BUILDING AGE ◆



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THE BUILDING AGE

NEW YORK, JUNE, 1913

A SUBURBAN COTTAGE OF SHINGLED EXTERIOR

A Design Embodying Some Rather Quaint Features of Exterior Treatment
—An Excellent Example of Shingle Effects

WE have taken for the subject of the present article a cottage of compact arrangement and rather quaint exterior treatment, involving features calculated to interest a large class of readers. The design is somewhat unusual in the architectural effects produced by the combination of shingles and cement. Noticeable features include broad and narrow

house and having on the rear side an open fireplace of attractive design, flanked on either side by a comfortable seat. The hall is centrally located so that the living and dining rooms, opening from it at the right and left, really constitute one large apartment. The main stairs rise from a point just about in the center of the house and are well lighted by a large window,



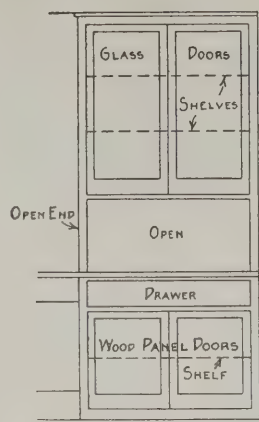
A Suburban Cottage of Shingled Exterior—View in the Living Room Looking Across the Main Hall Into the Dining Room Beyond—Tallmadge & Watson, Architects, Chicago, Ill.

courses of shingles extending on all sides of the house up to the sills of what constitutes the second-story windows, which are so placed as to somewhat resemble dormers; the stucco treatment above the shingled area and running to the wall plate; the deep overhang of the cornice; the open balcony directly over the front porch, and the very quaint construction of the glazed sash which are made to swing outward as casement windows.

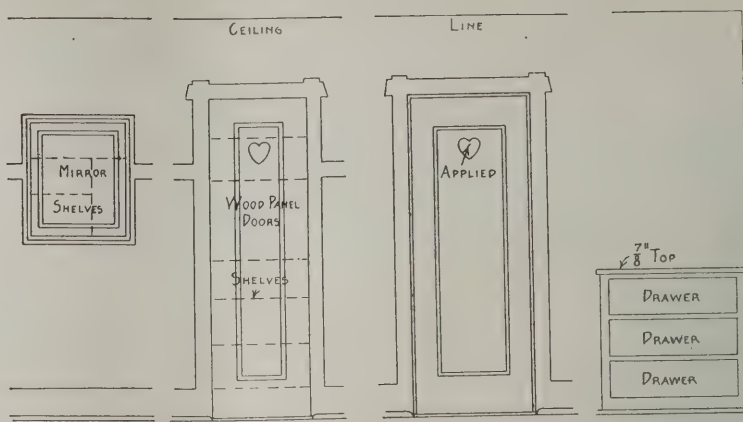
On the first floor the conspicuous feature is the living room extending entirely across one end of the

clearly shown in the picture of the rear elevation. The dining room at the left of the hall has ready communication with the kitchen, the entire arrangement being compact and convenient. On the second floor are three bedrooms, a sewing room and bathroom, together with ample closet room. A feature is the case of drawers just at the top of the stairs and so placed as to be readily accessible from all the rooms.

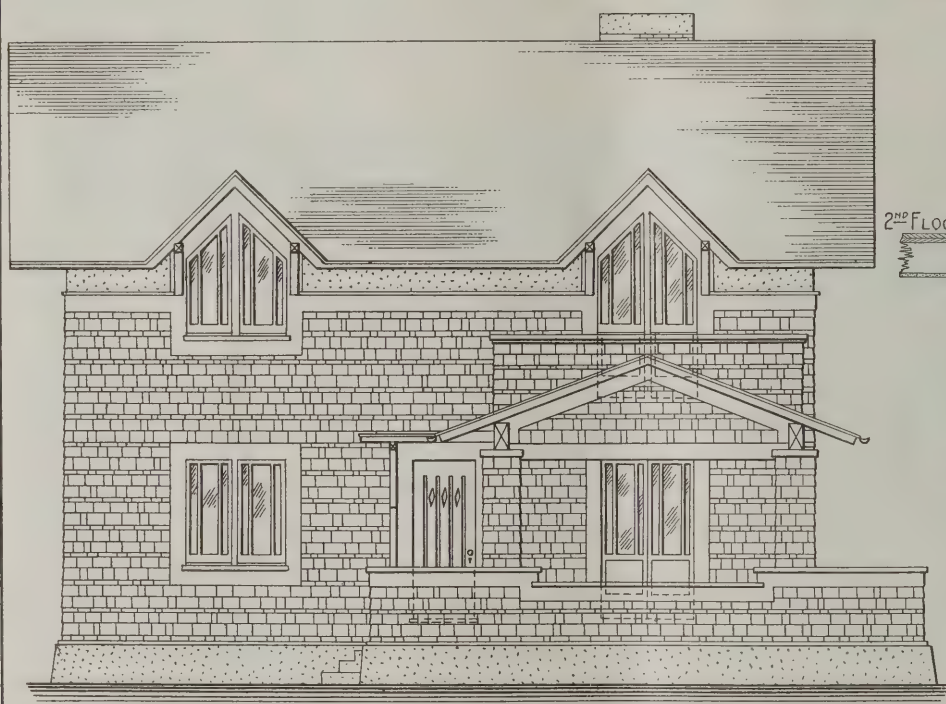
According to the specifications of the architects the foundation walls below grade and on the outside above grade are covered with a $\frac{1}{2}$ -in. coat of Portland ce-



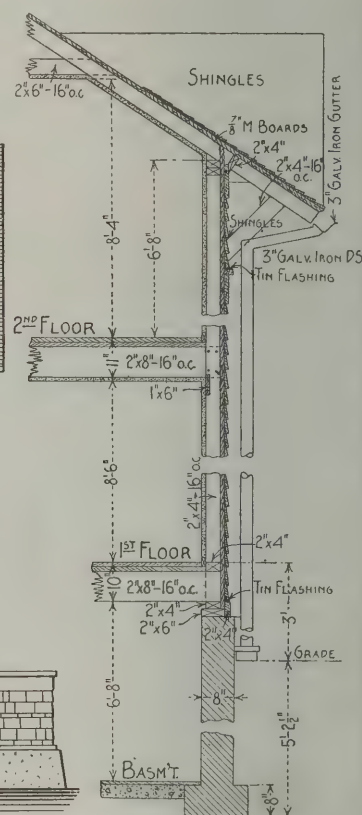
Elevation of One of the Kitchen
Cases—Scale $\frac{1}{4}$ -In. to the Foot



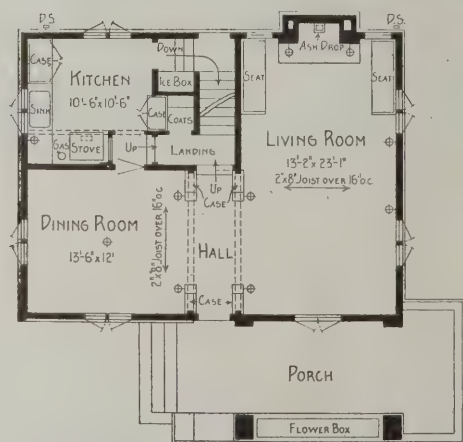
Details of Medicine Case, Toilet Case, a Typical Door and Case of Drawers in Hall on Second Floor—Scale $\frac{1}{4}$ -In. to the Foot



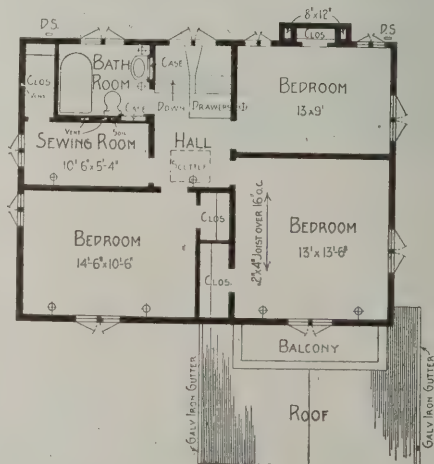
Front or West Elevation—Scale $\frac{1}{8}$ -In. to the Foot



Section Through Main Wall
—Scale $\frac{1}{4}$ -In. to the Foot



Main Floor Plan—Scale 1/16-In. to the Foot



Second Floor Plan—Scale 1/16-In. to the Foot

ment mortar mixed in the proportion of one part cement to one part sand. The framing lumber is of hemlock and the roofing boards and girders are of No. 2 yellow pine. The inside studs are 2 x 4 in. placed 16 in. on centers and all openings in bearing parti-

surface which contrasts well with the shingled area.

The front porch is ceiled as is also the soffit of the gables with $\frac{7}{8}$ x $2\frac{1}{4}$ -in. matched and beaded No. 1 white pine.

All chimney flues have their entire length lined with fire-clay-tile flue lining laid up in Portland-cement mortar.

The floors are double, the finished flooring for all the rooms in the first story except the kitchen and pantries is of selected $\frac{7}{8}$ x $2\frac{1}{4}$ -in. side and end-matched red oak, while the finished flooring for the rooms on the second floor as well as for the kitchen and pantries is of $\frac{7}{8}$ x $2\frac{1}{4}$ -in. side and end-matched selected beech. Between the floors of the rooms in the second story is a single layer of Florian sound-deadening felt made by Bird & Son, and between the floors of the rooms in the first story is a single layer of "CO-TED" building paper. The latter material is also well lapped and doubled around all window frames.

Each span of floor joist has a double row of 2 x 4-in. birch well nailed in place.

All casement window frames are made for $1\frac{3}{4}$ -in. case sash to swing out, the construction being No. 1 white pine and $1\frac{3}{4}$ in. thick. All outside doors are $1\frac{3}{4}$ in. thick, made of white pine with $1\frac{3}{4}$ -in. red-oak sills. All frames are made according to special detail. The sash throughout is $1\frac{3}{4}$ in. thick, made of white pine and divided with wood muntins as shown in the pictures.



A Suburban Cottage of Shingled Exterior—The Street Front

tions have double heads and are well trussed. All openings in the exterior walls also have double heads and are trussed where necessary. Interior partitions have 2 x 4-in. floor and ceiling plates, while all bearing partitions have double 2 x 4-in. ceiling plates.

The outside frame and roof is covered with $\frac{7}{8}$ -in. sheathing boards, over which is a layer of "CO-TED" waterproofing building paper made by Bird & Son, East Walpole, Mass. Where shown on the elevations the outside walls are covered with extra Star "A" cedar shingles laid in narrow and broad courses on the vertical walls as indicated on the elevations, while on the roof they are laid $4\frac{1}{2}$ in. to the weather.

All exterior trim is of No. 1 white pine, painted, and porch floors and steps are of "B" quality white pine.

The exterior walls above the shingled area are furred with $\frac{1}{2}$ x $1\frac{3}{4}$ -in. strips laid 16 in. on centers. To this furring is attached metal lath for carrying the cement finish indicated in the half-tone engravings presented herewith. This is three-coat work, the first coat consisting of lime mortar as specified for interior work with enough Portland cement added to make it set firm and hard. The second coat is composed of one part Portland cement to three parts lime mortar, while the third coat is composed of fine crushed limestone screenings and Portland cement with enough color added to give a light yellow ochre effect. This is thrown on with a trowel, giving a rather smooth



The Garden Front Showing the Outside Chimney

All interior window and door frames are lined with $\frac{1}{2}$ -in. thick lining to match the finish of the room. The trim throughout is of red birch and all door jambs and heads are $\frac{7}{8}$ in. thick, the jambs being rabbeted to receive the heads. All rooms on the first floor and the second-story hall have $\frac{7}{8}$ x $3\frac{3}{4}$ -in. continuous head

trim as per details. All trim is made with hollow backs.

All interior doors are $1\frac{3}{8}$ in. thick, made of birch. The outside entrance door is of birch $1\frac{3}{4}$ in. thick,



A Suburban Cottage of Shingled Exterior—View in Main Hall Showing Stairs at the Left and a Glimpse of the Living Room Beyond

while the rear entrance and rear balcony doors are made of pine $1\frac{3}{4}$ in. thick. The stairs are of red oak, the risers being $\frac{7}{8}$ in. thick with treads $1\frac{1}{4}$ in. thick. The treads and risers are housed and glued into $1\frac{1}{8}$ -in. wall stringers, making a box-stair treatment. The stairs to the basement are made with $1\frac{3}{4}$ -in. thick treads with open risers and plank stringers.

The cellar floor is of concrete 3 in. thick, composed of one part Portland cement, two parts clean, coarse, sharp sand, and four parts broken limestone to pass a $1\frac{1}{2}$ -in. ring. Over this concrete is $\frac{1}{2}$ -in. skim wearing surface or coat, composed of one part Portland cement to two parts coarse, sharp sand, carefully floated and troweled to an even surface. The concrete was mixed in boxes holding not more than ten barrels at a time. All concrete floors pitch to the drain, as shown on the plan.

The walls and ceilings of the rooms are lathed and plastered. The first coat of mortar was mixed in the proportion of one barrel of pure lime to three barrels clean, sharp sand and half a bushel of hair, the mortar being slacked three days before using.

The wainscot in the kitchen is treated with a coat of hard finish composed of lime putty, white sand or marble dust and plaster of Paris. The cement wainscot in the bathroom is marked off in imitation of tile 4 in. square.

The bathroom is fitted with a 5-ft. Occident bathtub

made by the Standard Sanitary Mfg. Company, Pittsburgh, Pa., and the lavatory is of the J. L. Mott Iron Works manufacture.

In the kitchen where shown is a 20 x 36-in. white enameled sink with 12-in. white enameled back and nickel-plated cocks and drain. The two-part washtrey is of Alberene stone made by the Alberene Stone Company, 223 East Twenty-Third street, New York City.

A 40-gal. galvanized-iron hot-water tank supported on cast-iron standards is also provided for supplying the hot-water fixtures throughout the building, and has all necessary connections to the furnace.

The building is piped for gas to the bathroom, kitchen and laundry, and is wired for electric lighting.

All exterior trim is painted with two coats best white lead and oil and the shingles of the roof were given one coat of Cabot's bleaching oil, the balance of the shingles being left natural. All interior trim was given one coat of Detroit White Lead Works single coat stain.

The outside of the bathtub and the 5-ft. wainscot and trim in the bathroom have three coats of white lead and oil, over which was applied two coats of white enamel, and left with an egg-shell gloss. All trim in the kitchen and pantries is finished with two coats of Berry Brothers liquid-floor-granite varnish.

The cottage here illustrated and described was erected at a cost of about \$3,800 for F. H. Lauder and is located at 626 Fair Oaks avenue, Oak Park, one of the many attractive suburbs of which the city of Chicago can boast.

The plans were prepared and the work of construction supervised by Tallmadge & Watson, architects, 1004 Security Building, Chicago, Ill.

Cement Finish for Woodwork

One of the problems which often confronts the painter of the present day is to finish the woodwork of a house in such a manner that it will correspond with the cement used in construction. The cornices, bal-

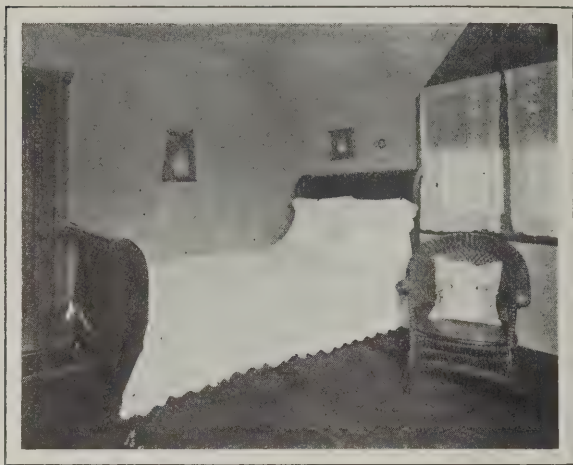


View in the Living Room Looking Toward the Open Fireplace

conies and porches must be finished to look as if they were made of cement, and this is not at all difficult, the only question being if the owner will allow sufficient funds for the extra amount of labor involved in doing the work as it should be. A writer in a recent issue of

the *Modern Painter* states that he has finished several houses in this way with entire success, and describes the process somewhat in its details as follows:

First, it is natural that the surface should have the granulated or the rough appearance of cement, and, therefore, it is best to sand the woodwork. The process is, of course, well known to the ancients, but to



A Suburban Cottage of Shingled Exterior—View in One of the Sleeping Rooms

the young men growing up in this generation it is out of date and sometimes even unknown.

After the wood has been well primed, give it a second coat of oil and lead color; have the paint quite heavy, and use only oil for thinning—use no turpentine. Into this paint blow sand, with a sander, in the old-fashioned way; this gives the surface the desired stone-like appearance. Now, when this has been well dried, paint it over again with the so-called cold water paint. This cold water paint may need a word of explanation. Some have used it and had bad luck; others have not used it at all, and look upon it as a fake, but it has a place and a large usage. For coating cement walls, both smooth and pebble-dashed, it is ideal, and for painting sanded woodwork it is superb.

It has been a matter of surprise how long woodwork treated that way can stand. This paint is insoluble in water, and, as it dries up, an absolute mat. A sanded surface painted with it looks exactly like stone or cement blocks.

The color, of course, must be carefully matched. Cold water paint comes in a white powder, cement gray, and several tints. It is most practical to buy the white in bulk, and a small quantity of the different shades, then mix together to obtain the right color. In mixing this paint, great mistakes are often made. It can be done in one way only, namely, this: First, put a certain quantity of the dry powder into the pail or keg, then add a small amount of water and stir it well; add water as more and more of the powder is worked up. Keep it a thick paste until it is thoroughly worked up and then thin it to the proper working consistency. Remember, it is paint, not white-wash, so do not thin it too much. It must be the con-

sistency of heavy batter, and a good result is assured.

If, on the other hand, the powder is poured into a pail of water and stirred around, the substance will foam and lose its mordant power, and it can be brushed off after it has dried on the wall. The cold water paint is strong enough, so that for light tints the ordinary water-color pigments can be used. Yellow ochre, vermilion red, umber and black can be mixed up dry in powder before water is added, or stirred up in separate cups and added after. It is to be remembered that this is water color, and that it dries out lighter. It must dry before the exact shade can be known.

As for the prepared tints, it is to be said that the cement gray is too dark to suit the taste of most people. Mixed with equal parts of white, it becomes more acceptable, and often two parts of white and one part of gray will be pleasing. In using cold water paints, it is preferable not to mix too much of it at a time, although it will not spoil by leaving over night.

In working on a large house, when the same color has to be made many times, it is best to set a pot of the color aside and match all the succeeding batches to it. In this way one cannot go far away from the original. For working on rough plaster or pebble dash, round brushes, especially those set in rubber, are to be preferred. The bristles should be of the best. When the surface is very rough, it is well to stipple the paint into the holes so as to make the coating substantial; a superficial washing over is worse than nothing.

Pointing Brick Walls

When pointing up a crack in the mortar between bricks, it is necessary to cut out the mortar a little longer than the crack and about $\frac{1}{2}$ in. deep. This should be filled with a half-and-half mixture of cement and clean, sharp sand. In replacing cracked or broken bricks, great care should be taken to see that the brick



View in Kitchen Looking Toward the Sink and Cupboard With Gas Range Shown Just at the Left

is firmly bedded into the mortar on all sides, or the wall will leak and then settle in that particular spot.

The new building-by-law recently before the Council of Westmount, Canada, permits the erection of two-flat houses in certain parts of the city.

A UNIQUE ROOF FOR A RATHER UNIQUE BUILDING

Details of a Southern Hotel Using Mountain Boulders for Exterior Walls and Reinforced Concrete for the Roof Covering

By N. BUCKNER

WE have at intervals in the past presented for the consideration of our readers designs of buildings in which cobblestones or field stones were used with picturesque effects and we now call attention to a building of unusual construction in which the outer walls are built of mountain boulders broken to sizes convenient for handling, and having a unique roof of reinforced concrete. The building in question is the Grove Park Inn, located at Asheville, N. C., and in the picture, Fig. 1, we show what is to be the end of the south wing of the building as one views it looking toward the north. The rustic stone effects as produced by the use of the mountain boulders are clearly indicated, as is also some details of the roof construction.

The crates shown in the foreground of the picture are filled with solid porcelain bath tubs with which the Inn will be equipped.

The building proper, which measures 80 by 396 ft. in plan, is in three sections and each section will be covered with a roof consisting of a solid concrete slab $5\frac{1}{2}$ in. thick reinforced with $\frac{1}{2}$ -in. twisted steel bars, of which more than 90,000 lb. were required.

In order to make the roof entirely waterproof the slab received a five-ply treatment as follows:

First there was a filler or priming coat and next a coat of hot Trinidad asphalt. Over this was placed a layer of felt rubbed on while the asphalt was hot. A second coat of hot Trinidad asphalt was then applied and a second layer of heavy felt was put on.

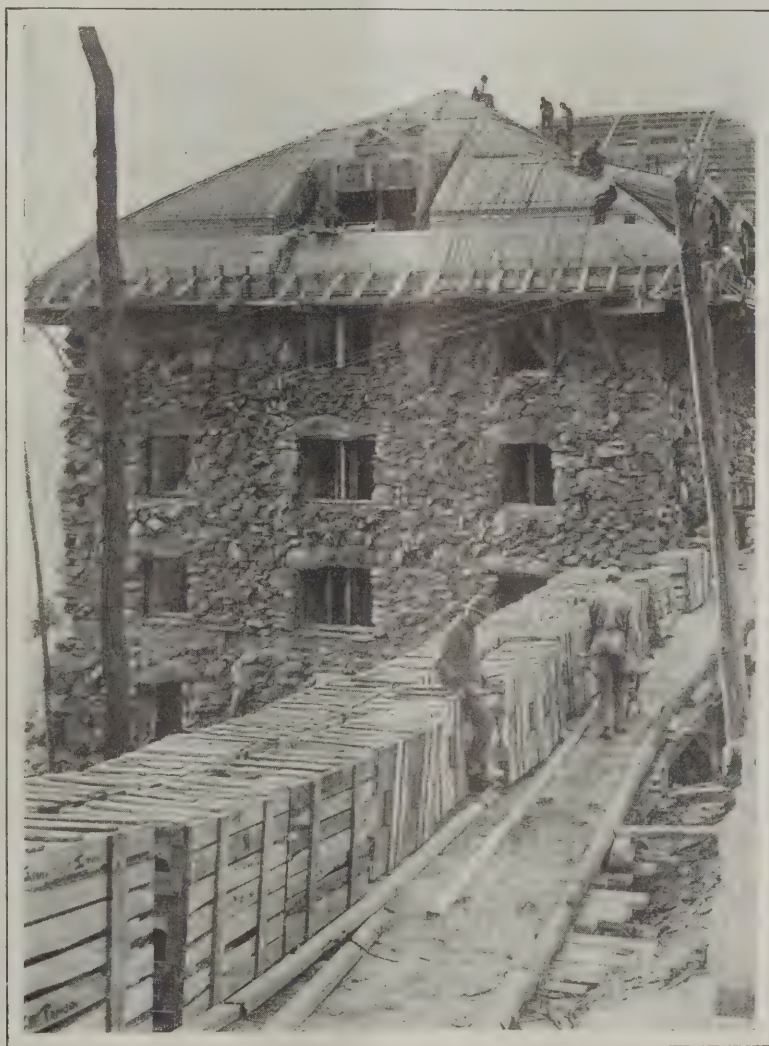
Over all this will be laid red tile shingles 13 in. long, 6 in. wide and $\frac{3}{8}$ of an inch thick. The shingles will be fastened in place with 4 d copper clad $1\frac{1}{2}$ -in. nails driven through a hole in the shingle into the special

five-ply treatment and then into the sand and cement slab.

Narrower tile will be laid in irregular courses around the dormer windows while over the peak, which will be rounded, will be laid a No. 14 spun copper sheet merged into the tile shingles in such a way that the eye will not detect the difference and all of which will give to the roof the now popular thatched appearance.

There will be no angles in the roof or any portion of the building, as all turns will be made along lazy, graceful lines that flow downward rather than sharply drooping over the eaves, which project nearly 6 ft., while the base of the eaves is $4\frac{1}{2}$ ft. below the top of the main walls of the building. These tile shingles were furnished by the Murray Roofing Company, Cloverport, Ky.

In Fig. 2 is shown a portion of the main roof laid with 12 in. square twisted steel rods ready for the concrete to be poured. Fig. 3 shows the workmen pouring the concrete slab roof on the north wing of the building, one side being already completed. Fig. 4 represents the roof of the building showing the concrete slab completed, also the lazy lines



A Unique Roof for a Rather Unique Building.—Fig. 1.—End of the South Wing of Grove Park Inn.—Architect F. L. Seeley, of Asheville, N. C.

of the roof and of the several dormer windows.

The walls of this unique structure are of granite quarried from the mountainside nearby all laid in cement, while the outer face of the walls is covered with rough mountain boulders as they were taken from their mountain beds. This produces a wonderfully rugged, but picturesquely beautiful and unique effect.

One of the features of the Grove Park Inn is the lobby, or "big room," as it is called, measuring 80 x 120 ft. in area. Here are six huge posts which with the beams and the ceiling are of concrete made of a 1:2:4

mixture reinforced with 1-in. round steel bars. In Fig. 5 we show the forms for the beams and posts in the lobby ready for the concrete to be poured into them.

The concrete posts in the lobby are 30 in. square, 23 ft. 4 in. high and were designed to carry 1000 tons each,

the basement for laying the big concrete conduit for carrying the plumbing, etc. The contract for the plumbing is in the hands of J. C. McPherson & Son, Asheville, N. C.

The building is wired for electric lighting by the indirect system, the contract for the work being in the hands of the Piedmont Electric Company, Asheville, N. C.

In Fig. 7 of the illustrations we show a 16 wagon train loaded with mountain boulders and being hauled to the site of the building by a 3-ton Packard motor truck.

F. L. Seeley, who has entire charge of the construction work, is the architect of the building, and the contracts are being carried out under his direct supervision.

The contract for the concrete work is in the hands of the Southern Ferro-Concrete Company, Atlanta, Ga.

It may not be without interest to state that the Grove Park Inn is picturesquely located on a shelf of Sunset Mountain, which swings eastward around the city of Asheville, varying slightly to the north, immediately overlooking the 18-hole

all turf golf course of the Asheville Country Club, and into which merges an additional 60 acres of grassy lawn belonging to the Inn proper, while to the rear there are 800 acres of mountain forest extending upward to an altitude of 3117 ft. Across the links and beyond is a gently undulating plateau, back of which is piled up tier on tier of great mountain ranges, forming a series of sky line with Mount Pisgah as the culmination of altitude at 5749 ft., the sweep of vision covering the meanderings



A Unique Roof for a Rather Unique Building—Fig. 2—Portion of the Main Roof Showing Metal Reinforcement in Place and Ready for the Concrete to Be Poured

but the actual weight carried is only 300 tons for each post. The beams are 24 in. wide across the bottom, 60 in. high, with a 24-in. flare at the top. The whole effect when completed will be very imposing.

The pouring of the concrete began at seven o'clock on a Monday morning and continued day and night until 7:30 o'clock on the evening of Saturday following. A force of 150 men was employed in the execution of this particular work—100 by day pouring the slab or panel work and 50 by night pouring the beam work. In all beam work $\frac{3}{4}$ and $\frac{7}{8}$ -in. square twisted steel bars were used, crossed at short distances and tied.

There were used in this piece of work more than 2500 bags of Portland cement, while in the entire building will be used more than 80,000 bags of "Clinchfield" Portland cement furnished by the Clinchfield Portland Cement Company, Kingsport, Tenn. The twisted steel used in all of the reinforced concrete work was furnished by the Atlanta Steel Company, Atlanta, Ga.

The floors of the various rooms of the Inn are of cement with a 30-in. border of a silver gray tile. The walls of the bedrooms will be wainscoted with different colors of burlap in quartered oak panels to a height of 6 ft., above which and extending to the ceiling the area will be painted cream white.

The bath room fixtures are of solid porcelain, the tubs weighing 910 lb. each. The fixtures were furnished by Haines, Jones & Cadbury of Philadelphia, Pa. All plumbing is concealed in chases in the walls of the building. In Fig. 6 we show the ditch or trench in



Fig. 3.—Workmen Pouring the Concrete Slab Roof on the North Wing of the Building, One Side Being Already Completed

of the horizon for a distance of more than 100 miles.

The eight-story reinforced concrete frame and floors of the new Wulsin building in Indianapolis are said to have been completed in exactly eight weeks.

Storage of Portland Cement

It is a well-known fact that Portland cement is easily affected by moisture, for it is purposely so made. Combined with water and other substances it forms that well-known building material—concrete. Moisture, however, must be kept away from the cement until it is needed for actual use and this means that it must be stored in places which are and can be kept absolutely dry. Upon the proper storage of cement are dependent the reputation of the contractor or builder, the trade of the local dealer and the satisfaction of the user.

On account of the quantity which they often keep on hand contractors frequently build special houses for the storage of Portland cement. Almost any material will do for the construction provided it will shed water and remain waterproof.

Frequently, for temporary storage, contractors build sheds of "up and down" plank covered on the outside with one or more thicknesses of tarred paper. The floor must be above possible high water and open so that the wind can circulate under it. To make the house more completely dampproof, the floor should be double or its equivalent. Often the same effect is obtained by a makeshift double floor of loose timbers and boards laid upon the regular floor. For such a temporary shed there is nothing better than a well-made one-way-slope tarred paper roof on sheathing laid with tight joints lengthwise or in clapboard fashion

use of cement in the work is dependent upon acceptance by test, provision for piling should be made in accordance with instructions given below for dealers.

According to the Association of American Portland Cement Manufacturers, the same general principles stated above apply to storage houses for dealers in cement, although the house is usually made more

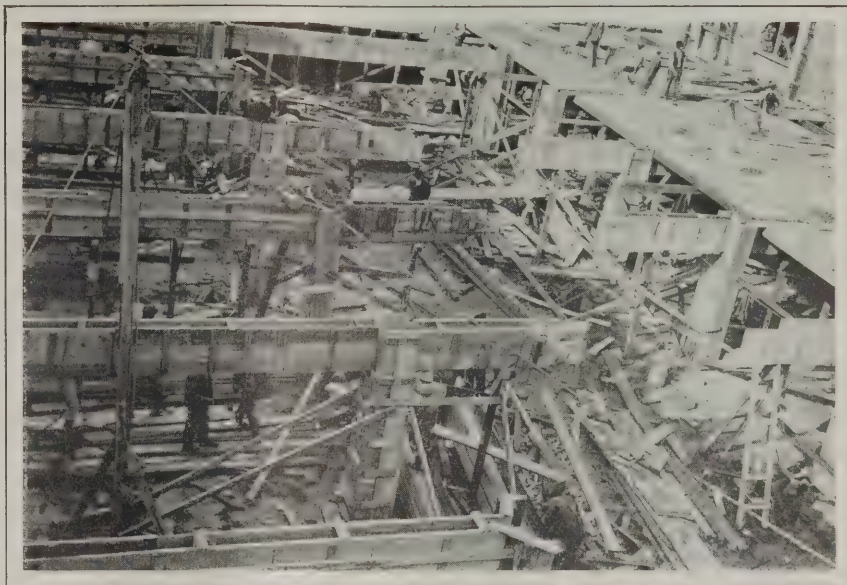


Fig. 5.—Showing the Forms for the Beams and Posts in the Lobby Ready for the Concrete to Be Poured

permanent in character. It should be supported by a concrete foundation extending below the frost line. For a permanent building the concrete floor should be placed on sufficient coarse, compacted gravel of broken stone fill to bring the floor level a foot above the surrounding ground, slope the surface of the floor toward the door. For a one-story building a 6-in. reinforced wall is sufficiently strong

and with a reinforced concrete roof the cement will be protected from dampness.

Since Portland cement weighs practically 100 lb. per cubic foot, the beams of the floors elevated above ground must be heavy and be supported at frequent intervals by concrete piers. If window openings are necessary, do not use sash. A strong door hinged at the top and capable of being fastened on the inside is much better for keeping out dampness. Often the building has a solid or skeleton lining on the inside, for reasons given under directions for storing cement. It should be well sway-braced on the inside to prevent springing of cracks or bulging.

The size of the house is dependent upon the extent and character of the dealer's trade. An average carload of Portland

cement contains about 175 to 200 bbl. of four bags each. In determining the necessary size of the cement sheds, consider that each bag of cement stored will occupy 1 cu. ft.

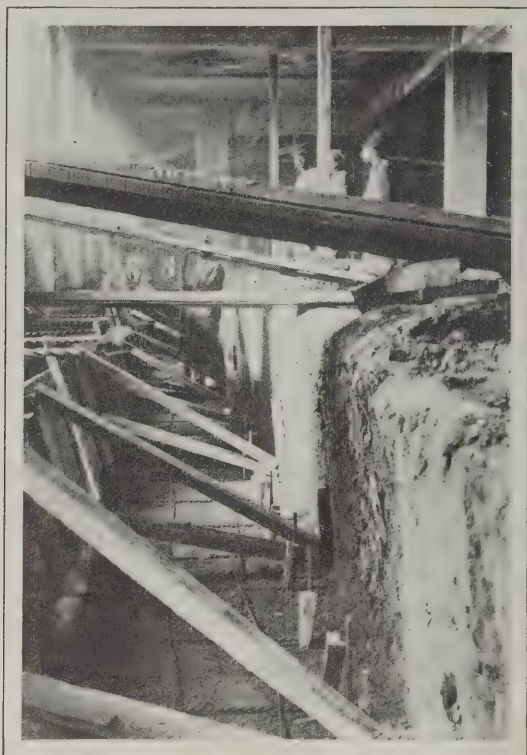
The character of the trade has much to do with fixing the size of the storage house. Especially dealers who supply contractors should have sufficient room



A Unique Roof for a Rather Unique Building.—Fig. 4.—Roof of the South Wing of the Building, Showing Concrete Slab Completed; Also Lazy Lines of the Roof and the Dormer Windows

crosswise. Let the roof have a drip or overhang of at least a foot on all sides. See that it is absolutely watertight, that the rain cannot beat in under the eaves, and that the roof is fixed so firmly that a wind storm will not raise it. It is advisable to put no windows in such a house and to have the door so securely hinged and fastened as to keep out intruders. Where

to keep every shipment separate; for cement used by contractors and builders must often pass a seven or twenty-eight day test before being used. Moreover, every cement storage house should be large enough to have aisles between the piles of various shipments, so



A Unique Roof for a Rather Unique Building.—Fig. 6.—The Ditch or Trench in the Basement for Laying the Big Concrete Conduit for Carrying the Plumbing

that cement may be removed from storage in the same rotation as it was put in.

Portland cement weighs nearly 100 lb. per cubic foot, therefore judgment must be exercised in loading the floor. Likewise, on account of its weight and possible damage from dampness, do not pile the cement against the side-walls of the building unless the house is full-lined or skeleton-lined on the inside. Store the cement so as to leave an open space or an aisle along the side-walls and aisles at places necessary to separate shipments. Get rid of all possibility of the cement piles toppling over by laying the bags, as a mason would say, "headers and stretchers," that is, alternately lengthwise and crosswise, so as to tie the pile together. Examine the building frequently to see that there are no leaks in the roof or side-walls.

Even on the work, never pile cement on the ground or on bricks. Throw down a few blocks, lay boards upon them and make a dry floor for the cement. Have just enough cement on the work to keep things going. A good tarpaulin is handy to cover up the cement in case of a sudden shower. Always buy cement from the dealer who has a dry storehouse. If the cement in the bag has been wet it is hard as a rock; do not use it under any circumstances. However, do not mistake lumps caused by pressure in the storehouse for "set-up" cement. Such lumps crumble easily and the cement is perfectly good. Take care of the Portland cement just as carefully after receiving it as a good dealer does, and properly mixed with sand and stone or gravel it will yield a building material proof for all time against fire and repairs.

A course in architecture is being considered for the State University of Nebraska, located at Lincoln, Neb.

Architecture and School Hygiene

One of the important topics on the program of the Fourth International Congress on School Hygiene which is to be held in the city of Buffalo, August 25 to 30, of this year, is the relation of school architecture to school hygiene. A special symposium is being arranged on the subject of school illumination by the Society of Illuminating Engineers. Dr. James Kerr, of London, England, for many years an active member in London Council, and an international figure in affairs relating to school hygiene, will read a paper on the "Illumination of Class Rooms," while "Re-circulation and Ventilation" is the title of a paper which will be presented by Dr. Luther Gulick of New York. Other papers on the subject of architecture will be read by Frank Irving Cooper, president of the Boston Society of Heating and Ventilating Engineers, who will speak on the "Planning of Schoolhouses Against the Fire Hazard," and by Prof. Hough of University of Virginia, on "Some Aspects of the Problem of Ventilation."

This Congress on School Hygiene will be the first to be held in America and it will represent the most elaborate effort yet made in this country toward getting the problem of school hygiene before the world.

Some Famous New York Landmarks

Among the few remaining landmarks of old New York which are to be found on the lower end of Manhattan Island are two adjoining houses on William Street, between John and Fulton Streets. They are three stories in height, with the characteristic dormer windows in the attic and the old-fashioned winding stairways still do service in reaching the upper floors.

The houses were built before the Revolution and the brick used in the walls was brought from Holland. It is said that the houses were standing when the Battle of Golden Hill was fought, a skirmish between the citizens and the British soldiery in 1775, preceding the Battle of Lexington. Golden Hill was on the crest of what is now John Street.

The presence of these ancient homes, which are of a type which largely prevailed from 1800 to 1840, in



Fig. 7.—A 16-Wagon Train Loaded with Mountain Boulders and Hauled by a Packard Motor Truck

such close proximity to some of the towering office structures of modern times makes a striking contrast and is a constant reminder of the wonderful growth of the Metropolis since the time when William Street was a favorite residential thoroughfare.

An English hospital now nearing completion is unique in that its rooms are wholly without corners.

DESIGN FOR THE NEW YORK COUNTY COURT HOUSE

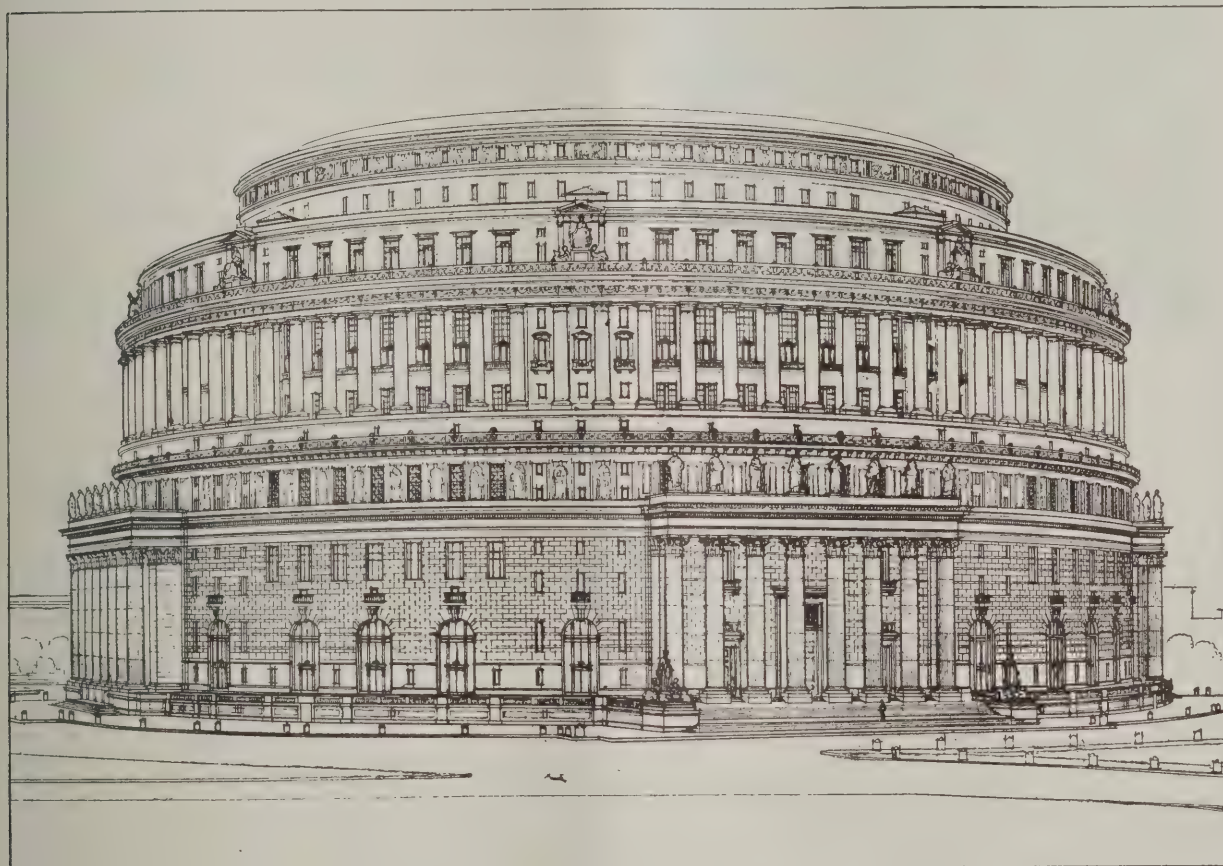
A \$10,000,000 Building, Circular in Shape, and Patterned to Some Extent After Famous Roman Structures

SUPPLEMENTING the brief reference in our last issue to the architect of the \$10,000,000 New York County Court House, we present upon this page a perspective of the building reproduced from the architect's drawing. In general style of architecture the structure is typical of many of the old Roman buildings, for though it is necessarily many stories high the elements in the design as in the buildings of the classic period have been kept few in number. The architect has produced an exterior of great dignity for there is simplicity and impressiveness in the long, unbroken

floor for the City Courts and four floors for the Supreme Court. Above the court rooms are the library and dining rooms for the Justices and then adjoining a broad terrace overlooking the city and the harbor are the Justices' chambers.

A feature of the scheme is that separate elevator service for the public and the Justices is provided.

Each court has adjoining it rooms for witnesses and for counsel; also a gallery for the public and is amply lighted and ventilated both by windows on the outside and by windows in the interior light court. This ar-



Perspective View of New Court House For New York County—Architect, Guy Lowell, 225 Fifth Avenue, New York City

curves that cannot be easily obtained in the broken lines of an irregular or rectangular building.

The plan of the new court house is an outgrowth of the idea that the general scheme of the building should be such that all the work of the court can be carried on in the simplest and most straightforward manner. It makes no difference from which direction one approaches the building, there is always an entrance that leads directly to the large circular lobby in the center, around which all the elevators are arranged in one continuous ring. The court house, therefore, though monumental in character approaches in its practical details the business building type.

On the ground floor adjoining the entrance are important offices of the County Clerk, the waiting rooms for the public and the general consultation rooms for the lawyers, with rooms for the press. On the floors above are the court rooms, there being one complete

rangement is particularly advantageous as it provides in addition to the artificial ventilation ample natural ventilation and adequate protection against street noises.

Everything has been planned so as to make the saving of time all important and for that the circular form of building with its resulting compact scheme would seem to be particularly adapted.

The building itself covers about 120,000 sq. ft. of ground and the actual height to the Justices' terrace is 200 ft.

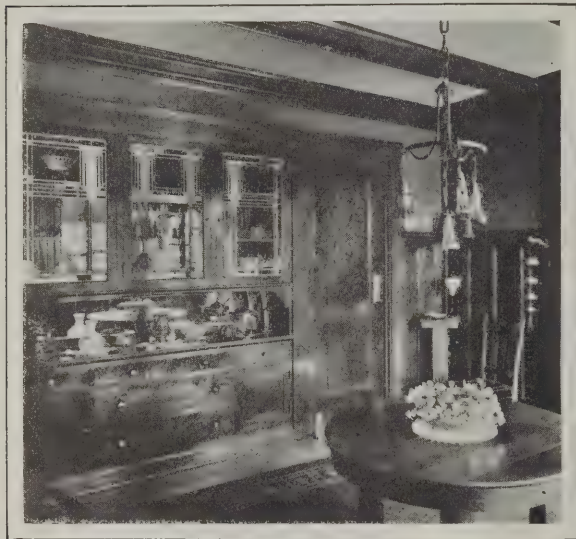
As stated in our last issue the architect of the new court house is Guy Lowell, 225 Fifth avenue, New York City.

A rapidly growing wave of silo building is said to be sweeping over the state of Texas.

SOME DETAILS RELATING TO BUILT-IN BUFFETS

A Class of Work in Which the Up-to-Date Cabinet-Maker, the Carpenter and the Builder Are Especially Interested

IN the design and construction of the modern home, whether it be that of the cozy-cottage-type of architecture so commonly known as the Bungalow, or the dwelling of a somewhat more expensive nature, it



View in a Dining Room Showing a Built-In Buffet Constructed of Slash Grain Wood

is the aim of the architect to provide as many conveniences as possible. This is especially true also in the case of the great multitude of flat or apartment houses where space is a very important factor and where domestic utilities are concentrated to the greatest possible extent.

One of the conveniences which has received no little attention in recent years is the built-in buffet and when appropriately designed and properly constructed, thoroughly harmonizing with the finish of the room in which it is placed, it is a source of pride and pleasure to the housewife.

The designs may be varied to an unlimited extent, being governed almost wholly by the purse of the owner and the surroundings in which they are placed. When properly constructed such fixtures produce most pleasing effects and constitute an important adjunct of the dining-room equipment. Even a low cost house may have a built-in buffet of attractive design for less than the cost of a piece of furniture that would answer the same purpose.

For the benefit of contemplative home builders among the many readers of *The Building Age*, the accompanying designs are offered as of suggestive value and illustrating the manner of construction by a valued contributor to these columns, A. A. Thogersen, of Portland, Ore.

All of the materials are of stock sizes and all moldings are stock patterns, the entire work being sufficiently simple and the drawing amply specific to be readily understood by the ordinary workman. The sizes of doors, panels, drawers, etc., are clearly indicated, or can be taken off with a rule, as the drawings are presented to scale. The designs are all drawn to conform to a 7 ft. door

but may be modified without altering the general elevations.

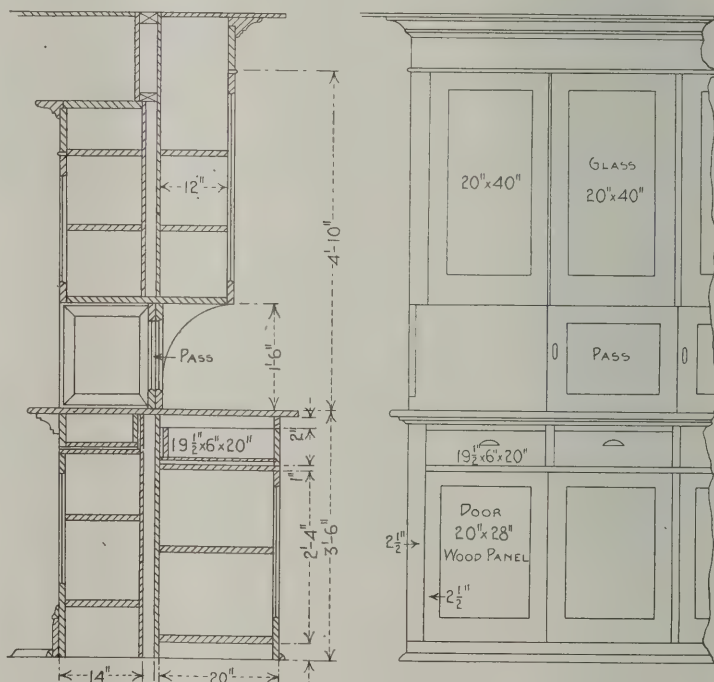
To add to the appearance of the finished work Mr. Thogersen advises the use of a little art glass cut in appropriate designs. This increases the cost but a trifle, while contributing materially to the appearance and finish of the buffet.

Wherever possible a mirror may be used at the back especially of the countershelf, as it tends to show off to much better advantage whatever may be placed on the shelves.

To simplify construction it is good practice to "trim" these fixtures to correspond with that used on doors and windows and to run the base in the same manner. It has the effect of making the buffet appear as a part of the house itself, which in fact it is, and reduces the cost appreciably.

It is recommended that as much of the work as possible be done at the bench. It is in fact possible to do it all there if due care be exercised and the buffet can then be set in place and secured in position with a few screws driven through the side panels from the inside into the studding. Should this be attempted care must be taken to place proper grounds for the plaster and also to see that the opening is true to size and plumb on the sides.

Occasionally it is possible owing to the position in the wall to build the buffet so that the face or front of it is flush with the wall line. The side panels are then eliminated and the sides may be plastered in the same manner as the back and as indicated in the details. It is, however, difficult to design a buffet of the nature



Sections and Partial Elevation of a Built-In Buffet and Dutch Kitchen—Scale $\frac{3}{8}$ -In to the Foot

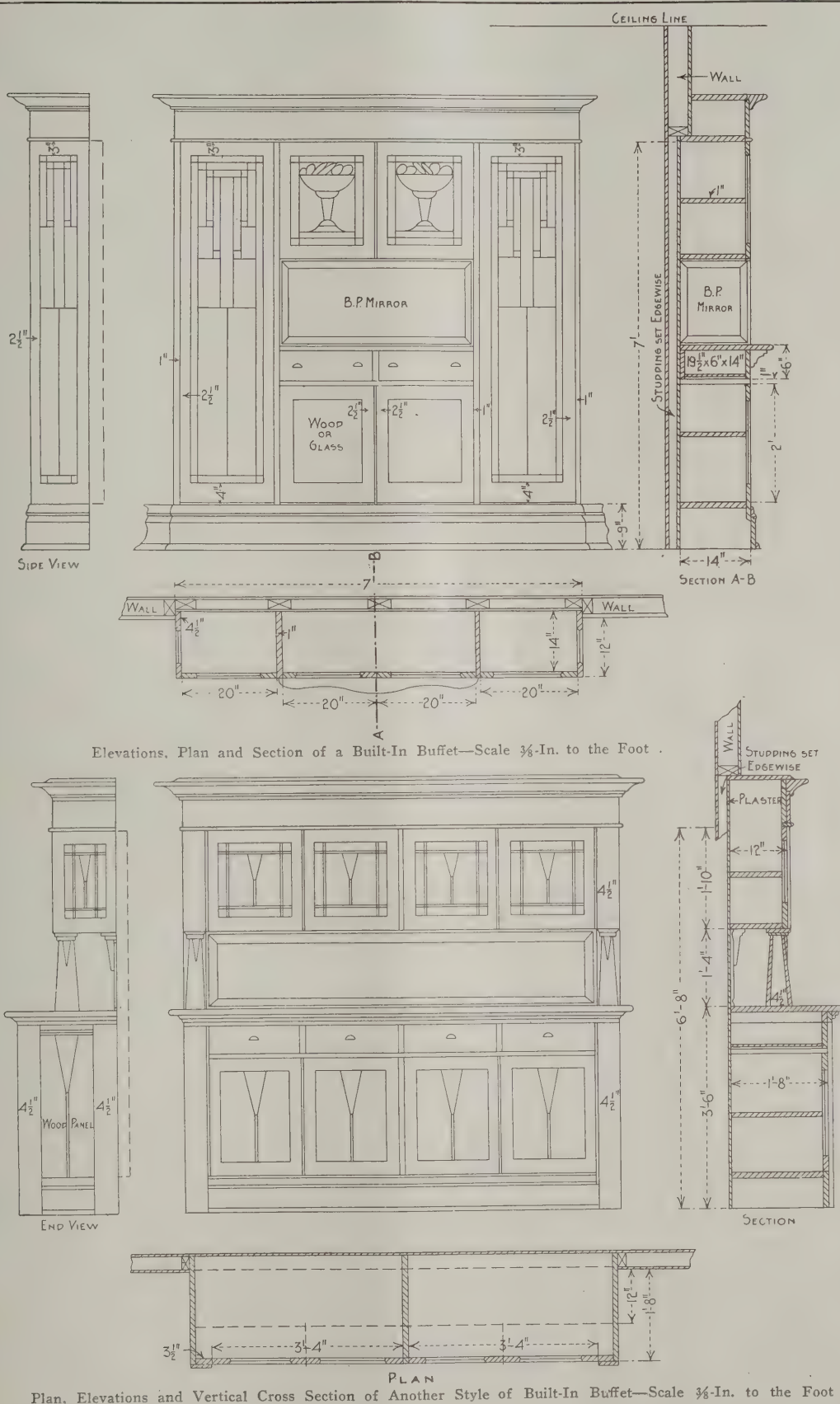
Some Details Relating to Built-In Buffets

here shown without having the plans of the room in which it is to be placed, but the sketches here presented will doubtless be found of suggestive value to many readers of the paper.

In the front elevation of the design shown at the bottom of this page the upper doors are of art glass measuring 20 x 22 in. each, while the lower doors consist of wood panels 20 x 24 in.

The drawers are 19½ x 6 x 19 in. The beveled

In the half tone illustration representing the interior of a dining-room presented in connection with this article, is shown a built-in buffet of rather pleasing design. It is constructed of what is termed slash grain wood which is in effect similar to that secured



Some Details Relating to Built-In Buffets, Contributed by A. A. Thogersen, Portland, Oregon

plate mirror at the back of the countershelf is 68 in. long by 15 in. high. The sides of the buffet are built to match the front, as indicated in the end elevation.

by quarter sawing. The picture also affords a glimpse of the beamed ceiling effect which so many people admire in the home of the present day.

A MODERN COUNTRY HOME OF MODERATE COST

A Half-Timber, Brick-Veneer and Stucco House Suitable for
Erection in Any Part of the Country

THE commuter is the man who links city and country together. He wants to live in the country with city advantages, to go daily to and from his city business and be surrounded by his friends. His principal aid in the accomplishment of this desire is undoubtedly the architect and the builder. The country home which forms the subject of our cover design this month was worked out to meet the requirements of this particular individual.

The First Floor

A lot 50 x 100 ft. will accommodate the house, its exterior of brick, stucco, timber and stained shingles forming a well balanced unit. The entrance to the house is from a spacious porch which extends across the entire front, and as one enters the well lighted living room with its splendid proportions, its beam ceiling, paneled walls, fireplace and book cases, he is impressed with its air of home comfort. The stairway is not made a conspicuous feature of the house, but it is conveniently located. The hall, with its large seat and double windows, the dining room, with its beam ceiling, paneled walls, casement windows, roomy window seat and buffet, all combine to give most pleasing effects. The dining room is within easy reach of the kitchen through a large and well equipped pantry. The latter also serves as a medium of communication between the kitchen and the rear entrance to the house. In it is placed the ice box, which is at the right hand as one enters the rear door. The cellar stairway leads from the pantry to the store room below and this neutral location makes possible entrance to the cellar without passing through the kitchen. The latter is provided with various closets, wash tubs and sink in one line and lighted by windows at right and left.

The Second Floor

The second floor has three bed rooms, one of which, suitable for two adults, occupies the entire front half of the story and is provided with a "nook" lighted by a triple window, the position of which at once suggests the construction of a large flower box beneath. The "nook" is flanked on either side by a large closet, as shown. A fireplace occupies a central position on one side wall between the clothes closet and the window, and entrance to the room is gained through a door just at the top of the main flight of stairs. The bath is placed between two bedrooms at the extreme right of the hall. It has a closet located over the stairs which, if desired, could be enlarged by extension toward the indicated location of the bath tub and fitted up as a linen closet with access through a door from the hall. The rear of the second floor is occupied by two smaller bed rooms, each provided with a clothes closet and lighted by two windows.

The cellar extends under the entire house. The foundation walls are of 10-in. concrete with footings 10 in. thick and 22 in. wide. All interior walls are plastered, using two coats with a sand finish. The second floor rooms have a hard smooth finish. The chimney breast below the mantle shelf is tiled and trimmed with brick, and the hearth is tiled with 6 x 6 in. red tile. The chimney is built of common brick laid in good cement mortar and the flues are lined with vitrified flue lining. The exterior of the chimney projecting above the roof is of stucco finish identical with

that of the exterior walls of the building. The chimney is capped with brick.

A brick veneer covers the exterior walls from the ground line to the second story and is bound to the frame with metal ties placed in every fifth course on every other brick, giving a 1-in. air space between the brick veneer and the sheathing, at the bottom of which is placed a 2-in. ventilating drain pipe.

The first floor joists are 2 x 10 in.; the second floor joists are 2 x 8 in.; and the studs 2 x 4 in., all placed 16 in. on centers. The rafters are 2 x 6 in., placed 20 in. on centers; the plates and the corner posts are 4 x 4 in. and the sills 4 x 6 in. All timbers are of spruce. The roof is laid with red cedar shingles exposed 5½ in. to the weather. The double floors throughout the house are of North Carolina pine, with floor felting placed between the rough and the finished floors. The doors and all trim are of cypress. Windows, door-frames, sash, outside trim, and timbers between stucco are of white pine.

The Interior Trim

The walls of the rooms on the first floor are tinted. The living room trim is stained and rubbed a smooth dull finish while that in the bed rooms is enameled cream white. The doors are stained mahogany and brought to a dull finish. All other rooms have two coats of paint. Roof shingles are dipped in stain. The sheet metal work has two coats of red lead on both sides. The outside trim is painted with two coats of white lead. The glass is double thick American.

The hardware throughout the house is of bronze plate finish. The exposed plumbing pipes are finished in nickel. The bath room floor is covered with mosaic tile and the side walls are wainscoted 3 ft. high with 6 x 6 in. cream white tile. Porcelain enameled plumbing fixtures are used in the bath room. In the kitchen earthenware trays and an iron enameled sink are used. A 40-gal. heavy galvanized iron boiler is furnished and a gas range is installed. The house is heated by steam and wired for electric lighting and the outlets are so arranged that combination gas and electric fixtures can be used.

On a cost unit of 19½¢ per cubic foot, we have a total of \$5,510.70, figured on a cubical contents of 28,260 cu. ft. based on the following data: Size of house 24 ft. x 36 ft., second floor having 1 ft. projection over first floor on sides. Approximate size 25 ft. x 36 ft. x (approximate height) 30 ft. = 27,000 cu. ft. Size of porch 12 ft. x 35 ft. x (approximate height) 12 ft. x ¼ = 1260 cu. ft.

Detailed Estimate of Material and Labor

Excavating and grading.....	\$ 180.00
Masonry work, including concrete footings, foundation walls, brick veneering, chimney and fire place.....	760.00
Plastering exterior and interior.....	650.00
Carpentry work, including lumber bill, mill work, etc.....	2420.00
Hardware	110.00
Metal work.....	140.00
Plumbing and gas fitting.....	275.00
Heating	400.00
Electric wiring.....	80.00
Painting, staining and tinting.....	320.00
Combination lighting fixtures.....	85.00

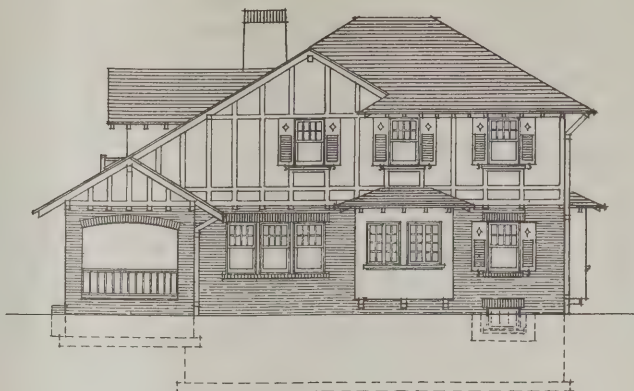
Total\$5420.00

This amount includes the contractor's 10 per cent profit.

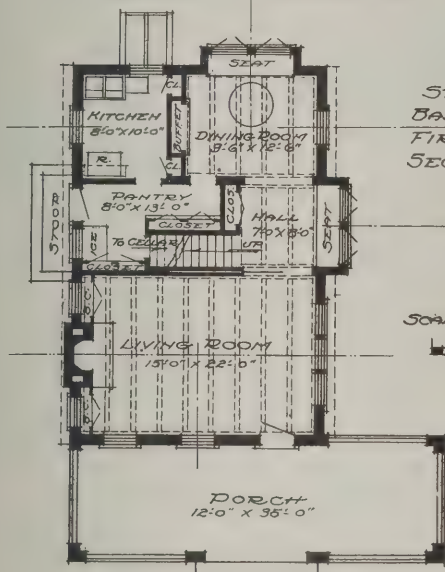
The home here illustrated and described was designed by Arthur Weindorf, architect, Long Island City, N. Y.



FRONT ELEVATION

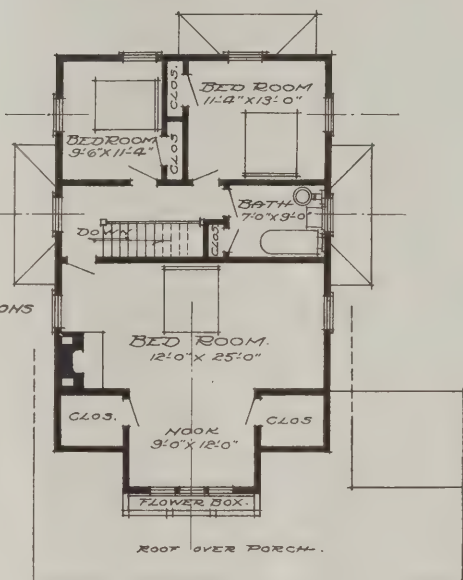


SIDE ELEVATION.



STORY HEIGHTS
BASEMENT — 7'0"
FIRST FLOOR 9'0"
SECOND " 8'6"

SCALE FOR PLANS & ELEVATIONS



SECOND FLOOR PLAN.

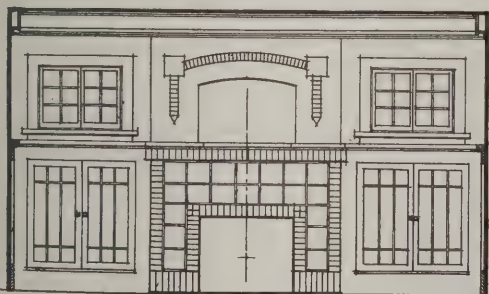
FIRST FLOOR PLAN



SIDE ELEVATION



REAR ELEVATION.

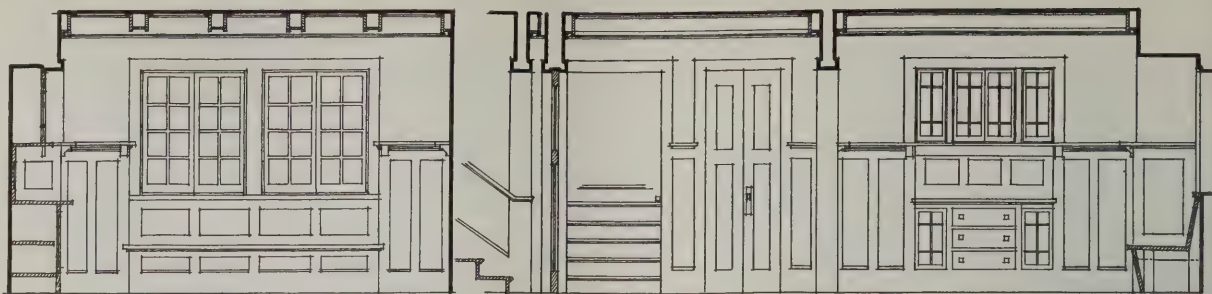


SECTIONS SHOWING FIREPLACE, BOOK CASES, WALL PANELING, BEAMED CEILING, ETC. IN LIVING ROOM

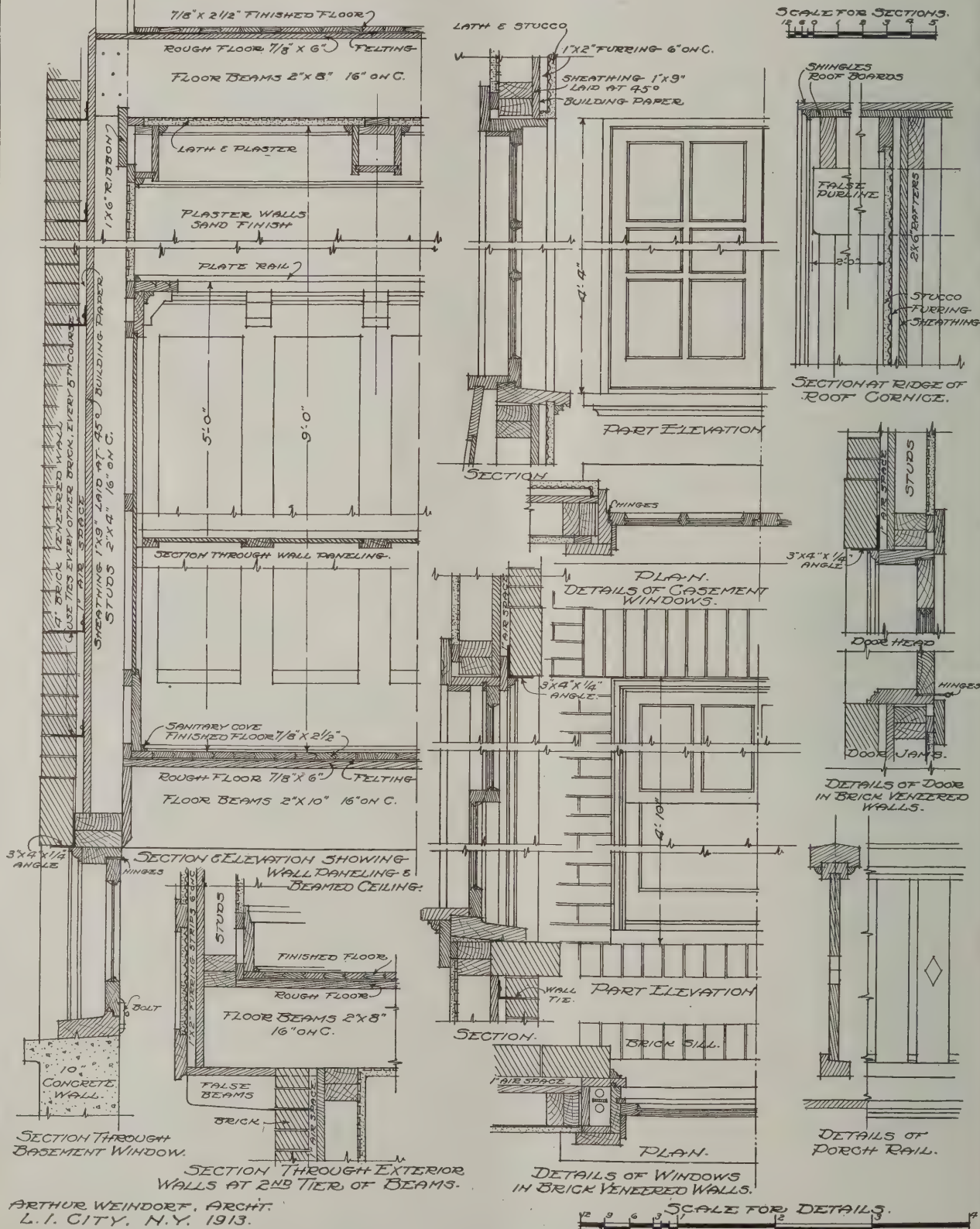
ARTHUR WEINDORF, ARCHT.
L.I. CITY, N.Y. 1913.

SCALE FOR SECTIONS.
2' 0" 4' 0" 6' 0" 8' 0" 10' 0"

Plans, Elevations and Miscellaneous Details of the Country House Design Shown on the Front Cover



SECTIONS SHOWING BUFFET, SEAT, CASEMENT WINDOWS, WALL PANELING, BEAMED CEILING IN DINING ROOM, AND STAIRS, CLOSET DOORS, ETC. IN HALL.



FIGURING BRICKWORK IN BUILDING CONSTRUCTION

Some Pertinent Suggestions for Preparing Estimates of Brickwork with Special Attention to Cost of Labor and Materials

By A. S. ATKINSON



THE cost of brickwork must, of course, vary considerably in different parts of the country owing to the wage scale and the cost of bricks, sand, lime and labor. The rather arbitrary rules figured by masons to ascertain the cost may serve as a general guide in figuring out estimates, but they are frequently far off the actual cost. The only sure way for taking up the problem intelligently is to study all the various items carefully, and then making estimates for the particular job based on this data. If one is considering a job of any size great care should be exercised in verifying these figures.

In making such estimates the cost should be made first on the materials and then on the labor, including all incidental expenses. A rule that is adopted by engineers for brickwork is to figure on 14 bricks per square foot of 9-in. wall, and 21 bricks per square foot of 13½-in. wall, making deductions for all openings. This means an allowance of 7 bricks per square foot for each half-brick thickness of wall.

If we accept this method of figuring we have 48 sq. ft. of 12½-in. wall for each thousand bricks, or practically 2 cu. yd. This is frequently taken as the standard unit of measurement. Masons, however, usually figure on 22½ bricks per square foot of 12-in. wall, which includes all openings and corners.

In former years manufacturers of bricks had a few standard sizes, and it was much simpler to apply the arbitrary rules for estimating by the thousand; but today the size and thickness of bricks varies considerable, and the tendency is to increase the number. The unit measurement must, therefore, show wide variation in different localities. The average size of bricks is generally placed at 8¼ to 8½ in. long, 4 in. wide and 2¼ to 2⅝ in. thick. But there are plenty of bricks both larger and smaller than this size. Some in New York are used as small as 7½ x 3½ x 2 in., and as large as 9 x 4¼ x 2½ in. The larger size with joints will lay up 800 to the thousand in a wall of standard measurement, and the small size 1100 and more to the thousand-brick measurement.

Variation in Sizes of Brick

Bricks vary in price as much as in size, and while \$6.50 to \$7 per thousand may be the average price at the yard they may in some instances cost \$8 to \$10 per thousand or seconds as low as \$6 per thousand. The quality of the bricks must be clearly specified before any figuring can be undertaken. The cost of getting the bricks delivered varies greatly, depending upon conditions. Usually in cities where brickyards are near the manufacturers charge a uniform price for delivery. If shipped by train from the brickyards, the cost of freight, unloading and hauling must all be added to the cost of the materials. These charges may amount to several dollars per thousand in some localities. The conditions of the streets and roads makes an important factor in the situation. For instance while a team may haul 1500 bricks as a load across good city streets, the same team could barely haul more than 500 bricks over rough dirt roads of the

country. All these factors must be considered before the contractor can place an estimate to yield a profit.

The cost of mortar and scaffolding required should next be taken up. Of course, the amount of mortar used depends upon the thickness of the joints, and the joints vary a good deal in different classes of work. Taking the standard joints as a guide the amount of mortar required per thousand bricks will be as follows:

With ⅜" joints.....	½ cubic yards of mortar
With ½" joints.....	¾ cubic yards of mortar
With ⅝" joints.....	1 cubic yards of mortar

The amount of mortar needed being ascertained, it is next wise to proportion the ingredients so that orders can be placed accordingly. Lime mortar is used today only in the cheaper class of structures, and it should never be used in any heavy work, neither should it be used when exposed to great dampness. In engineering structures and in underground work all cement mortar is frequently specified and used. But for the majority of jobs sand and Portland cement in the proportion of 1 to 3, 4 or 5 are used for the mortar. To make up a cubic yard of 1 to 3 mortar there will be required .85 cu. yd. of sand and 2 bbl. of Portland cement or lime. Usually both lime and cement are used with the sand, but these vary considerable in proportion. One part lime, one part cement to six parts sand is a common specification.

One reason why one part lime is generally added with the cement is that it makes the mortar much easier to work with, and in the cost of labor this amounts to considerable. In the modern efficiency movement attention must be given to such little details. A bricklayer working with cement mortar lays fewer by 100 bricks in an hour than if he used mortar softened with one part lime.

For a cubic yard of mortar then, with sand at 50 cents per cubic yard, lime at 50 cents per barrel, and cement at \$1.75, we would have about the following cost with a proportion of 1 to 3 lime mortar:

0.85 cu. yd. sand at 50 cents.....	\$0.43
2 bbl. lime at 50 cents.....	1.00
Total	\$1.43

A richer and better formula of lime, cement and sand in the proportion of 1 to 1 to 2, would have the following cost:

0.85 cu. yd. sand at 50 cents.....	\$0.43
1 bbl. lime at 50 cents.....	.50
1 bbl. cement at \$1.75.....	1.75
Total	\$2.68

For a strong cement mortar commonly used for engineering and underground work with a proportion of 1 to 3, we would have this:

0.85 cu. yd. sand at 50 cents.....	\$0.43
2 bbl. cement at \$1.75.....	3.50
Total	\$3.93

The cost of sand is purely arbitrary, and cannot be fixed. It can often be obtained for the cost of carting, but it rarely costs as much as \$1 per cubic yard. However, this must be considered for each locality, and prices obtained before any estimates are put in.

If 1000 bricks of 8¼ x 4 x 2¼ in. were piled up solid without mortar they would occupy 1.65 cu. yd. of space. If the bricks cost \$6.50 per thousand a

cubic yard of them would then cost approximately \$3.96. This comparison will enable one to see at a glance the relative cost of bricks and mortar. In the case of the cement mortar the cost of bricks would be practically the same as the mortar, but for lime, cement and sand mortar the cost for the latter would be about one-third less than the bricks, and for plain lime mortar the difference in the cost is more striking.

Having analyzed the cost of materials, so that the estimator can get clearly in mind the relative amount and cost of the various ingredients of his trade, the labor cost should next be taken up. Labor is the one item that makes bricklaying so expensive in some parts of the country. The cost of materials are fairly constant throughout the country, but labor is not. This varies as greatly as the efficiency of the men themselves. High wages do not always mean high-grade, efficient workmen.

Bricklayers are paid all the way from 50 to 75 cents and more per hour. Probably 60 cents is as near the average paid throughout the country as can be made. Hod carrier's and mason's helpers, who keep the bricklayer supplied with mortar and building scaffolds, receive from 30 to 45 cents and more per hour. These rates vary so materially that one can never figure on a job in another town or state without knowing exactly beforehand the union scale of wages prevailing there. It is never safe to assume that the same wages are paid in any two places. Many a contractor has lost heavily on contracts simply through failure to ascertain in advance the exact scale of wages prevailing in certain towns both for masons, laborers, hod carriers and carpenters. Figured on wage scale basis, one might ask how much does labor cost per thousand bricks.

Cost of Labor Per M Bricks

The answer to this depends upon the ability and efficiency of the men and the amount of work the contractor can get from them in a day. While working on narrow piers and projections, the laying of 500 bricks by a man may be considered a good day's work, the average on a 9-in. wall may be at the rate of 1100 to 1400 in a nine-hour day. On 13-inch walls the average should run as high as 1300 to 1600 bricks, and on an 18-inch to 22-inch wall from 1500 to 2200 bricks in nine hours per man. On heavy foundations, where the work is the simplest, it is not uncommon for bricklayers to average 3000 bricks a day and even 5000 bricks have been laid by bricklayers when rushed.

On buildings equipped with an elevator and distributing arrangements, the labor of laying bricks may be as low as \$1 per thousand, but on high buildings and narrow walls the labor may run all the way from \$2 to \$4 per thousand. The cost of scaffolding must be considered in all such contracts, for this takes labor and material. A carpenter must be employed for scaffold erection at rates ranging from 20 to 40 cents per hour. The carpenters may be withdrawn from some other part of the building to erect the scaffolds, but the charges for their time should be placed in the cost of bricklaying. It hardly pays to get masons or mason's helpers to erect the scaffolds. They do the work clumsily, and oftentimes in such a way that the scaffolds are dangerous. Besides this it takes them much longer to do the work than a skilled carpenter. Hod carriers and mortar men are better at their particular jobs, and it rarely pays to attempt to turn them to another skilled trade even in emergencies.

The cost for laying a cubic yard of bricks in a wall may then be figured out as follows:

MATERIALS.

459 bricks at \$7.00 per M.....	\$2.84
Freight on bricks	.56
¼ cubic yard of sand.....	.11
Freight on sand.....	.06
0.22 bbl. of cement at \$2 per bbl.....	.44
1 bu. lime at 20 cents.....	.20
Total	\$4.21

LABOR FOR CUBIC YARD OF WALL.

Bricklayers	\$2.62
Laborers	.93
Carpenters	.39
Unloading materials	.58
Total labor	\$4.52
Total materials	4.21
Labor and materials.....	\$8.73

As 1000 bricks of the average size when piled up solid without mortar makes practically 1.65 cubic yards, and the amount of mortar used for good joints increases this pile so that the thousand bricks when laid up in a wall equals about two cubic yards, it will be seen that by doubling the above estimate for each cubic yard of wall we have the cost per thousand bricks at \$17.46, which includes all materials and labor.

The work figured by the ordinary rules for a snap estimate will be a few dollars under this estimate. But a snap estimate is never intended to be more than a guide. Masons generally employ the ordinary rule and then add a dollar or two to make sure of coming out even. There are many things which interfere with the proper working out of the rules. The character of the wall, time lost through the non-delivery of materials, interruptions of one thing and another, and faulty work of some bricklayers which necessitates tearing down a part of the work, all tend to increase the cost. On the other hand, some contractors can stimulate their men to such efforts that they can get one-third more work out of them. This, however, is something that is very uncertain, and can hardly be placed in the calculations. Good work is essential to the success of a mason contractor, and he cannot afford to drive his men to the point that details are overlooked. Masonry must be sound, plumb in line and well set throughout to pass inspection, and a fault here and there in the walls may be sufficient to condemn the whole wall or building.

A Bungalow on the Roof of an Apartment House

A unique residence in the form of a Bungalow is being built on the top of an eight-story apartment house at the corner of the Lake Shore Drive and Walton Place, Chicago, by William Ernest Walker, a well known architect of that city. The structure will be 110 feet above the sidewalk and will contain ten rooms. It is to be of white cement, with a green slate roof, green shutters, and red brick chimneys and facings at the corners. Its doors and French windows will open on two sides on to a terrace, the outer dimensions of which will be 120 x 65 feet. On the east frontage this terrace will be 20 feet wide, while on the long south exposure it will vary from ten to fifteen feet in width.

On the side facing Lake Michigan, which will open out from the dining room and hall, there is to be a shaded and pillared pergola 18 x 16 feet, where, in warm weather meals can be served. A handsome balustrade, about three and a half feet high, will rim the terrace which will be turned into "a hanging garden of Babylon" by means of bay trees, box trees, etc.

The interior arrangement will be most attractive and will include a large attic in the sloping roof with windows overlooking the city and lake. No window screens are to be provided, nor will they be needed because the house will be above the fly and mosquito zone.

If the roofs of all Chicago apartment houses were put to a similar use Chicago would have one of the most interesting and picturesque skylines in the world.

At a recent meeting of the Master Builders of Pittsburgh and vicinity it was unanimously agreed to advance the wages of carpenters from 50 cents to 55 cents an hour, the advance taking effect May 1.

DETAILS OF CONSTRUCTION FOR A BAND STAND

Design of an English Band Stand Which May Afford Suggestions
for the American Builder and Contractor

BY JOHN Y. DUNLOP

MUCH attention has been given recently in this country to the building of suitable outdoor amusement structures with the result that we have at the present time a simplicity of intentions in their constructional design. In these modern novelties of constructive work the craftsman is generally the artist and the development of the decoration is integral with the building craft.

The half tone engraving, Fig. 1, together with the line drawings presented herewith, relate to an arrangement of the platform and side rooms and cannot I am sure fail to interest a large class of your American readers. The foundations of the walls are solid brick work and the walls themselves are 9 in. thick built in Flemish bond with good lime mortar mixed with Portland cement in the proportions of two-third lime mortar to one of Portland cement. At the lower part of the wall a chamfered base is formed and underneath the platform a molded course has been introduced.

Of course there is no reason why this part of the structure could not have been erected in concrete except in this old country we go on erecting buildings year after year in the same old way, or at the most all the distance we have progressed is to place, safely and timidly, brick and stone facings to concrete walls.

In Fig. 2 is shown a plan of the concert platform and adjoining retiring rooms. Fig. 3 is a front elevation, Fig. 4 an end elevation, and Fig. 6 a detail of the cornice, while Fig. 5 represents the lower part or base of the structure with the floor joists in position.

Steel joists receive the floor of the platform, the floor being formed by placing rough boarding on the under side and filling to a depth of 6 in. with good Portland cement concrete. The edging of the cement floor is allowed to project on the front and the two ends past the line of the brick work and is finished with a bottled molding.

The joists for the rooms are $6\frac{1}{2} \times 2\frac{1}{2}$ red pine and are to be covered with $3 \times 1\frac{1}{8}$ pitch pine tongued and grooved flooring.

The partitions and wall above the platform level are formed by 5×2 in. battens. The studding is doubled

around all openings and all the partitions are trussed in themselves. On the side bearing partitions of the platform is placed a steel beam to support the roof.

Immediately on top of the 2 in. plate of the partitions are placed the ceiling joists at 18 in. centers. These are cut 5×2 in. and laid right across to receive the spar of the roof in a similar way to that shown in Fig. 5.

The ceiling joists for the center ogee roof are laid as indicated in Fig. 8. These in turn receive the pole plate into which the foot of the spars are notched. In roofs of this pattern the spars are kept well in from the gutter facing to allow a sufficient space for the shaped pieces to which the boarding is nailed.

Fig. 8 shows the spars in position ready to receive the shaped pieces which are cut from three templates, one for the front pieces, one for the sides, and one for the hip rafters.

The method of setting out these templates is shown in Fig. 7 and may be described as follows:

Draw the plan of the roof, then the diagonals which take the position of the hip rafters. Next draw the front view of the roof—the given section. Divide the half of the curve into any number of equal parts, in this case six, and project the ordinates

1, 2, 3, 4, 5 and 6 through the springing line on to one of the diagonals as shown by 1, 2, 3, etc. Erect ordinates to the diagonal line and make them equal in height to those of the given section. Through the points of intersection draw the compound curve which is the true shape of the member required for the hip rafter.

The end profile which gives the true shape of the front and back spars is obtained in the same manner; namely, by projecting ordinates from the diagonal and making them of equal height to those of the given section, then tracing the curve through the points of intersection.

These shaped pieces when cut are laid on the top of the straight spars and are securely fastened by nailing. The boarding is then placed in position, which is to receive the lead coverings.

The top of the roofs is covered with sheet lead 5 lb. to the sq. ft. and the method used in connecting the



Details of Construction for a Band Stand—Fig. 1—General View of the Completed Structure with Glass Enclosed "Shelter" in the Foreground

side joints of the sheet is by hollow rails with copper cleats. In Fig. 5 is shown a detail of the lower part of the roof or cornice with the metal gutter in front in which the lower ends of the sheets are lapped over the back of the gutter to make the joint water tight.

At the junction of the oak finial piece with the roof a lead apron piece is worked around with a soldered seam at the back. Above this the post and the ornament at the top are left uncovered.

Both sides of the framework of the walls are finished in plaster in which the studding walls are covered with metal lathing. The external coatings consist of one part Portland cement to four of sand and the finishing coat of a mixture of about 2:1.

This work was laid in two coats, the first, which is worked to screeds, is about half an inch thick. This coat must be carefully cleared and well wetted for the second coat, which is known in this country as the

wood finishing is in yellow pine. The door is square framed with no moldings and the windows have fixed frames with opening parts.

The shelter screens on each side of the platform are made portable so that they can be taken down at the end of the season. All the external plaster is painted white and stippled for a finishing in order to destroy the brush marks. Internally the walls and ceiling were treated with a bold and quick application of distemper and the woodwork is stained and varnished.

In connection with the band stand a most elaborate glass "shelter" has been erected for the public, a corner of which is seen at the left in the foreground of Fig. 1. This is a great advantage for outdoor entertainments in rainy seasons and where the ground space is not limited the small charge made for admission more than repays the cost and working expenses.

The frame work for the "shelter" consists of iron

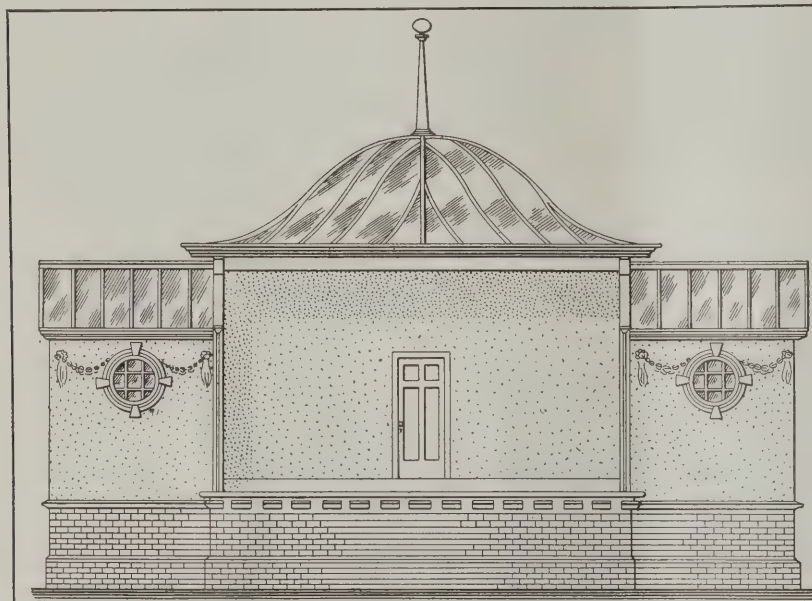


Fig. 3.—Front Elevation of Concrete Platform and Band Stand—Scale 3/32-In. to the Foot

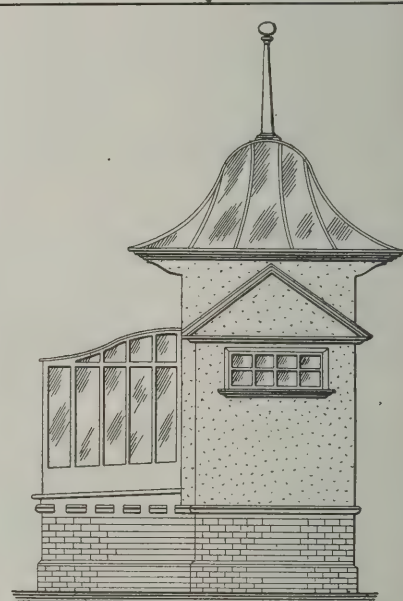


Fig. 4.—An End Elevation of the Stand—Scale 3/32-In. to the Foot

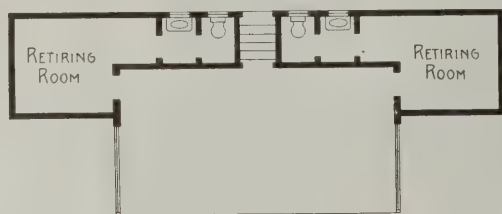


Fig. 2.—Plan of the Platform and Retiring Rooms—Scale 1/16-In. to the Foot

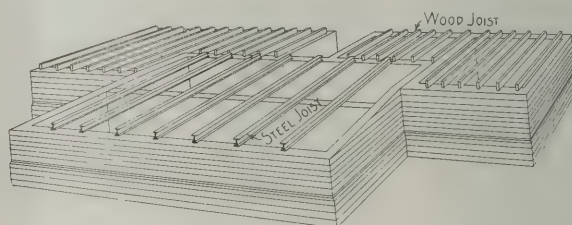


Fig. 5.—Lower Part or Base of the Structure, Showing Wood and Steel Joists in Position

Details of Construction for a Band Stand

finishing or "fining" coat and is about 3/16 in. thick finished with a hand float.

Internally the plaster which is a compound of lime, sand, hair and water, was laid in three coats. For the first coat a layer of well haired coarse stuff laid to a thickness of half an inch composed of sand and lime in the proportion of two to one; second coat, which is much finer than the coarse stuff, does not contain so much hair and is used in a softer state. The third coating is the finishing coat and consists of pure lime slacked and then saturated until semi-fluid and allowed to stand until the water has evaporated, forming a paste. It is then mixed with fine washed sand in the proportion of three parts sand to one of fine stuff.

The small entrance stairs at the back are built with solid concrete steps molded in position.

Each of the retiring rooms is fitted with lavatory and water closet in an up-to-date sanitary manner. All the

members filled in with glass windows. The roof also is glazed throughout.

Demand for Houses in Australia

Housing accommodations are evidently in great demand in Australia, if what a correspondent of a London paper says may be taken as a fair criterion. He says that as soon as the foundations of a house are laid would-be buyers or tenants interview the owner in order to secure the house on completion. I have heard of 16 applicants for one vacant house. It has been like this for years and apparently will continue so. On Friday a tenant vacated a house and on Sunday the landlord took a new tenant to see it but he found the house occupied, a man having discovered on Saturday afternoon that the house was empty and promptly moved in.

A Greater Need for Progressive Carpenters

BY VETERAN BUILDER

The observant and thoughtful man in any industry is the soonest to realize the changes that are brought about by varying conditions over which he has no control. This same man will be the first to heed these changes, particularly when they are likely to affect his future, and to progress with the upward movement. Even the most commonplace carpenter has been aware of a change in his trade within a few years, but as this has come about very gradually there has been ample warning given of the trend of events.

The decrease in the available lumber supply was one of the reasons for the change. A desire on the part of the builder, the architect and the owner to bring about a newer idea in construction had its weight in influencing the use of other materials. The publicity given to concrete, steel and clay materials likewise had its effect. The increased demand for materials that were

pearance. If we go farther back there was much of this work done by hand. Then came the machine, and the thoughtless carpenter thought his day was ended.

But he lived to see that it made newer opportunities for his hand and brain. Of the latter he would now need more than of the former. He began to open his eyes to the undreamed possibilities that were at his very doors. He found that there was more skill required and his work was more carefully inspected by the architect and the "boss." There were the laggards who fell by the wayside. But the men with brains pursued the newer opportunities and were amply rewarded for their perseverance.

Then came the later change, and the timid died of lost hope. Those who lived to see still farther ahead found the newer delights in more skilled labor and higher wages. It was now seen that the carpenters who would compete for the positions that were opened up, should fit themselves for places of artistic workmanship. There was less lumber used for exterior purposes, and some less for interior purposes, but that which was used demanded skill on the part of the operative. The increased size and the larger number of structures made the call for lumber large and the services of the high grade carpenter urgent. Instead of depriving him of labor his chances were doubled.

He was now compelled to give his occupation deeper study. There was more skill demanded of him, because the work was of a much higher grade. The interiors were fitted up with costly woods and the requirements

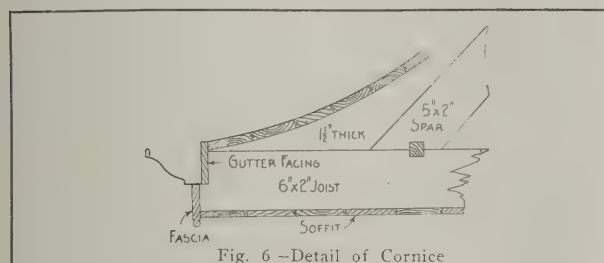


Fig. 6—Detail of Cornice

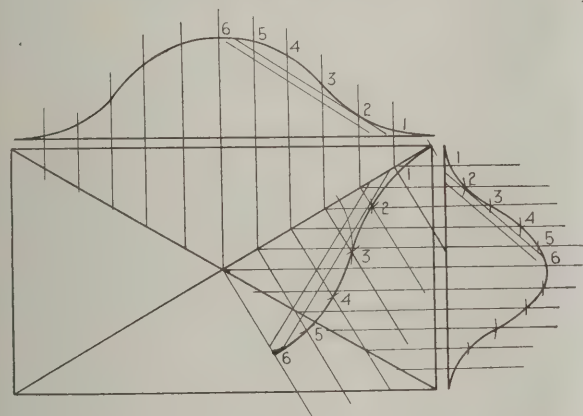


Fig. 7.—Diagram Showing Method of Setting Out "Templates" for Center Roof

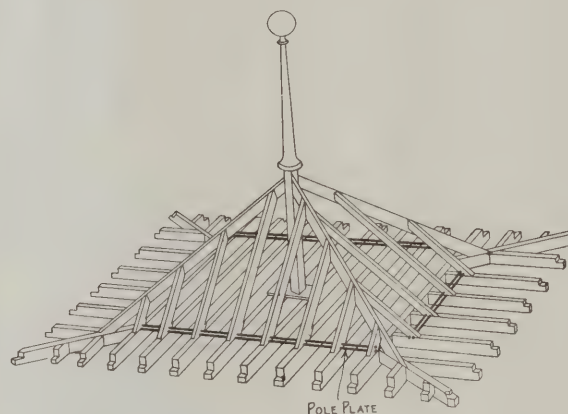


Fig. 8.—Framing of the Center Roof

Details of Construction for a Band Stand

at least partially proof against fire made itself felt. The longing for a more artistic architecture added its mite and there was no alternative—the change came.

But with this change how many carpenters opened their eyes and strode forward to meet it? Did they feel that their day of usefulness was at an end? Or did they look about them and note that with this change for the better there would be a larger demand for the services of men who were equipped to care for the work that some carpenters would be forced to do? Fortunate was this change for the progressive carpenter. It lifted him from his humble calling and placed him in a class with the highest priced artisans. It made possible the development of a new class of workers in this ancient occupation of house building.

In the old days there were many who could become fairly good carpenters. The average man could do the average work that was demanded of him for an average day's wages. With the completion of this there was not much to offer but a few, and these were quick to see and profit by the opportunity. It only demanded a limited amount of skill to labor at this trade, for much of the work was only of ordinary ap-

pearance. If we go farther back there was much of this work done by hand. Then came the machine, and the thoughtless carpenter thought his day was ended.

Note the interior of any structure today and compare it with the average building of a generation ago. Inspect the kind of labor and knowledge that is essential to its fulfillment. Now the carpenter uses his brain far more than his hands, and his knowledge is the price of his labor. There has not been a decrease in the use of lumber, speaking in one sense, nor a decrease in the demand for carpenters, in another sense. What has been required of both is a superior fitness and quality to bring about the uplift that is noted in both elements of the building industry.

Now a man has to understand the meaning and value of plans and specifications in order to undertake the higher grade work, and to so follow them as to avoid errors that will prove costly to the contractor or architect. He must be sure of his work before he essays to

do it. The restrictions are far more severe now in all cities, and the laws have become more exacting. There are fewer chances taken by the contractor, and the carpenter must likewise be a man who uses his brain.

Has this change not been a blessing to the man who is eager to profit by his knowledge and to make a still higher place for himself? There comes the demand for skill in the difficult feats of carpentry. The newer ideas have brought about newer problems to solve, and the laying of a floor, framing of a roof, building a stairway, setting of window and door frames, as well as other work, requires knowledge, skill and care, calls for brain and its use in this work. There is the place for the capable man. He is more and more in demand. His services will continue to increase in this way.

This brings the subject to that of teaching the young man who desires to engage in this labor. There is no time now for apprenticeship as it was conducted in the days past. The boy must be taught by others than his predecessors. Here is the need and the urgent call for the vocational school. This idea has been put into actual use during a few years to a greater and greater degree. There has been more and a larger consideration given to the need for apprenticeship in the schools. The technical trade schools are making possible the training of the youth to take up this labor. It has replaced the old method of training the new recruit to the betterment of the industry. There is demanded a greater skill, and the way to make this possible is through a practical education of the boys who are seeking this knowledge.

There should be a still greater incentive given the boys in this field of endeavor. There is a growing need for men who are capable of doing the work that is demanded of men with grit and brains. The skilled carpenter now stands with the cabinet maker in his work. He has not been outclassed or left in the background, as might be presumed by some. The carpenters today who are doing the higher grade work should seek still higher aims. There is every reason why they should be given deeper study, for upon this knowledge will it be possible to attain the heights.

Within the past fifteen years there has been a material increase in the wages of the better grade of carpenters, with a reduction in the working hours per day. In 1898, for instance, the wages of a construction man was 35 cents per hour. From this it rose in several years, and now he is paid 60 cents per hour. Millwrights receive 50 cents per hour, but there is nearly always ample work for them to do, thus offsetting the loss of time experienced by the former class. There is only eight hours to a day also.

So there has been progress in several ways with the carpenter who has been anxious to move upward. There are still greater opportunities ahead. Shall there be men with brain, brawn and determination who will profit by the example of those who have paved the way to greater things?

Poor Specifications No Fault of Contractor

A recent decision of the Kentucky Court of Appeals holds that a contractor is not liable for imperfections resulting from improper specifications and while relating to a street paving case it involves a principle that is of interest to building contractors as well.

In this case the defendant had been employed by the plaintiff to pave with vitrified brick a certain street in the City of Louisville, Ky., and although in the plaintiff's declaration no claim was made of non-conformance with the specifications, either in the use of materials or the character of the labor employed, the plaintiff sought to recover damages, because of the fact, admitted by the defendant, that within a short time after the completion of the specified construction, the

paving became defective and deteriorated to such an extent as to interfere with traffic.

In his answer, the defendant admitted the conditions alleged by the plaintiff, but contended that the condition about which complaint was made was the result of a strict compliance by the contractor with the provisions of the specifications. The defendant further showed in evidence introduced at the trial that he had made protest to the plaintiff concerning the nature of the specifications, in which he called attention to the fact that provision should have been made in the specifications for a construction involving the use of expansion cushions which the defendant claimed should have been placed at intervals of 50 to 75 ft. lengthwise of the street in a manner similar to the expansion cushions which were specified and used crosswise of the street.

In its opinion, the court stated that "the condition of the street is due to expansion of materials with which it was paved and that under the specifications no other result could have been reasonably expected."

National Fire Protection Association Meeting

The problems relating to fire protection which were discussed at the annual meeting of the National Fire Protection Association, held in New York City on May 13 to 15, were of a most interesting nature. In making recommendations for rules prescribing fire protection coverings for windows and door openings, the committee having the matter in charge laid stress on the fact that the position of such openings in relation to other parts of the structure is a very important factor in determining the degree of fire protection covering necessary. The committee made simply a progress report as it has not yet completed its investigations.

The report of the committee on fireproof constructions, including concrete and reinforced concrete, made recommendations for construction suiting the building designed for the greatest fire resistance and defined a standard building as one in which the lives of the occupants are properly safeguarded against fire and panic, so designed and equipped that damage resulting from exposure to fire from within or without shall be reduced to a minimum, and capable of sustaining a complete burnout of its contents without serious injury to its structural members. The committee on blower systems for heating, ventilating and stock conveying submitted a report which dwelt upon the importance of preventing the entrance of fires into flues and ventilating pipes.

Builders' Exchange Establishes Labor Bureau

The Builders' Exchange of Roanoke, Va., has established a labor bureau which is expected to result in mutual benefit to employers and employees. Any laborer desiring employment may register his name and address with the secretary, while contractors in need of help may apply at the headquarters of the Exchange and names will be furnished from the list of registered applicants for employment.

FIGURES relating to building operations in 200 cities in the United States for 1912 give a total of \$1,012,000,000, compared with \$946,000,000 in 1911, showing a gain for the year of 7 per cent., the total for 1912 exceeding any previous year but 1909, when building operations were about \$2,000,000 greater.

In the near future there will be constructed on a large mule farm near Kansas City, Mo., ten monolithic concrete silos in a row, each 20 ft. in diameter by 60 ft. in height.

INTERESTING LITTLE CHATS WITH BIG BUILDERS

A Successful Milwaukee Builder Who Is a Firm Believer in Price Maintenance Whether the Contract Be Large or Small

THE City of Milwaukee can be justly pardoned when it speaks boastfully of possessing a master builder who has the reputation of being one of the most competent and influential builders in the State of Wisconsin in the person of Samuel J. Brockman, a well known contractor and resident in that city.

Mr. Brockman's career in Milwaukee building circles has covered a period of thirty years during which time his activities have been distinguished by a succession of projects which have, in a large measure, made the city of Milwaukee what it is to-day.

Mr. Brockman carries on his business as a superintendent and general contractor, the former title being adopted by him on account of his former affiliations in municipal circles many years ago.

He is of English birth and parentage, having been born in Ramsgate, England, in which city he served his apprenticeship to the building trade. As a young man he came to the United States and his choosing of the Cream City as his final destination turned out to be a wise and profitable move.

It was in the early nineties that Mr. Brockman was elected Commissioner of Public Works, his first important undertaking in that position being the superintending of the erection of the City Hall. The magnitude of this project can be readily understood when it is recorded that the height of the building from the sidewalk to the balcony is 320 feet. The structure cost about \$1,000,000 and took approximately two years to erect, the cornerstone being laid February 24, 1894, and inaugural proceedings taking place December 23, 1895. Mr. Brockman has for an assistant, Harry Koch, son of former City Architect Koch, who prepared the plans of the imposing City Hall above mentioned.

The erection of the Wells building, an imposing fifteen-story office building in Milwaukee, was carried on under his personal supervision, and the Stephenson building, in which he conducts his business, was also built under his contract.

While his business has developed along the line of heavy construction, Mr. Brockman is a firm believer in price maintenance whether engaged on large or small work. He maintains that the reputation of the building trade is enhanced by square dealing and that if all builders would at all times endeavor to cultivate a greater feeling of stability and general thoroughness in all branches of the trade, a firmer foundation for price maintenance would be assured.

Erecting high-class and expensive residences has also been a specialty of Mr. Brockman's during the past few years and his contracts at present on hand for structures of this character amount to many hundred thousand dollars.

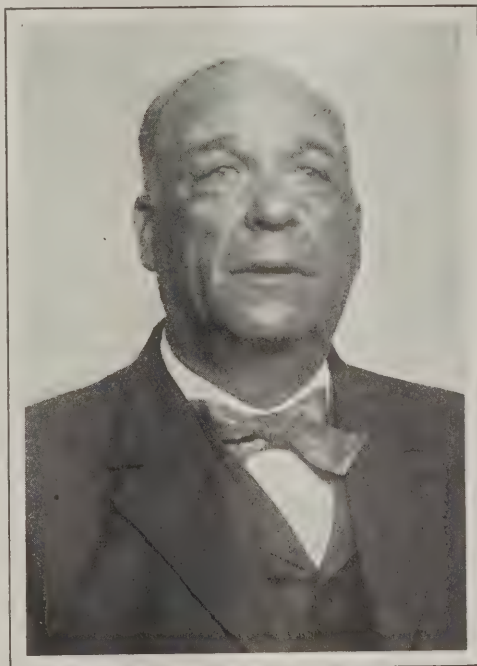
Tunnel work has played an important part in his

past transactions and the building of the tunnel under the Milwaukee river for the Atlas Flour Mills, was, according to Mr. Brockman, a task of no mean order. The construction of 6-ft. diameter tunnels for the Wells Power Company is also considered by Mr. Brockman as one of his best achievements.

Personally, Mr. Brockman is of a very modest disposition and when a representative of *The Building Age* endeavored at times to extract further information concerning his former work, he would pass over the subject lightly and speak optimistically of Milwaukee's future and the further development of the building trade in general. With the unusual activity at present prevalent in Milwaukee building circles, it is Mr. Brockman's firm opinion that this is an important step in making Milwaukee's position in the commercial

world one of greater importance and firmer standing.

Aside from his business obligations, Mr. Brockman takes part in the activities of the Elks Club, of which he is a member and as a member of the Builders and Traders Exchange he is a recognized authority on structural matters. He is also well known as an automobile enthusiast and when business will permit him he is often to be found comfortably seated in the driver's seat of a "self-starter."



Samuel J. Brockman, one of Milwaukee's Successful Building Contractors

Antique English Woodwork

The old English carpenters used good woods and they did their work well. When they built a house they constructed it to last. This is called to mind now and then when historic buildings in England are examined. One of the latest to be brought to public notice is an old house which has stood for more than 700 years near Hereford, England, and known in English local history as Rotherwas Mansion. The paneling and other interior woodwork consist of oak, sycamore, acacia and yew. There were twelve rooms finished in that way, and a comparatively large amount of wood was required, since veneers and thin boards were not fashionable when that house was built. Everything was solid and massive.

Collectors of antiques in England are expressing concern just now because of the announcement that the woodwork is to be stripped from the interior of the mansion and offered for sale at auction. It is believed that some of it, perhaps all of it, will be bought by wealthy Americans, and that English museums will miss a valuable collection of panels, posts, capitals, and other ornaments and carvings which bear the stamp of antiquity. The objects will be welcomed in this country, particularly if the purchasers should decide to place them in museums here where modern dealers and workers in wood will have an opportunity to study the venerable workmanship of old craftsmen.

EARLY HISTORY OF THE OPEN FIREPLACE

Many Homes in the Time of Queen Elizabeth Built Without Chimneys—Methods Adopted by the Romans for Warming Their Houses



EW visitors to the rugged Norman Castle of Carnarvon, in Wales, where the investiture of the Prince of Wales was recently held with great pomp and ceremony, probably remembered that this Norman pile in which every Prince of Wales since the first Edward, who was born there in 1283, has been invested with that royal title, has the architectural distinction, among many others, of having the first room in England with a regular fireplace with a chimney. It was

in the very room, in fact, in which that young prince was born and whose mother had been there that the expected heir to the throne might fulfill the Welsh demand that he should be born in Wales, that this new method of heating was installed, says a writer in an exchange.

And such a fireplace would not hold more than a quart measure. Chimneys did not come into general use in England until centuries later. The living rooms in most of the houses of that date were heated like the North American Indian heated his tent—by building a fire in the center and allowing the smoke to escape through a hole in the roof. On two occasions Queen Eleanor, who was a rather conspicuous woman of her time, was startled by the collapse of the rickety chimney of her own dwelling.

Invention of Stoves and Grates

The open fireplace was one of man's earliest devices to promote his own health and comfort; the upright flue for carrying off the smoke and gases of combustion is, comparatively, one of the latest, and even in the Sixteenth century the modern chimney was but little known. Leland, writing at that time on domestic architecture, used these words about the chimneys in Bolton Castle:

"One thyng I muche notyd in the hawse of Bolton, how chimneys were conveyed by tunnells made on the syds of the walls, betwixt the lights in the hawle and by this means and by no covers, is the smoke of the harthe in the hawle strangely conveyed."

Writers in the early part of the Fourteenth century knew nothing of chimneys. In the time of Queen Elizabeth so many homes of the conspicuous had been built without chimneys that it was often necessary to apologize to prominent guests who had to put up with rooms in which there were no chimneys. And ladies of distinction were sent out to other houses where they could enjoy this luxury. Thus it will be seen that the general use of chimneys is comparatively recent. And as for combining an open fireplace with the economy of an inclosed stove, it was not thought of until the time of Ben Franklin, to whom the idea occurred in 1744, as it did simultaneously to Jarot and Gauger.

The living rooms of the Romans were heated by burning charcoal in open pans in such a way as to avoid danger from the fumes. These pans are, in fact, still used in some sections of Italy. Charcoal fires without grate or furnace also heated the ancient Roman baths. It was long held by archeologists that Roman baths and homes were heated with hot air, through hypocausts, as shown by tubulations in floors and walls, but

the recent investigations of Krell, a modern heating engineer, are to the effect that these hypocausts and tubulations were designed to dry the rooms only by carrying off moisture and had nothing whatever to do with heating them. Krell makes out a strong case.

Heating Bathrooms

The Romans, however, had a crude method of hot water heating their bathrooms, as well as knowing how to introduce hot water to their bathtubs, which were built of masonry and lined with marble. But they knew nothing about plumbing; therefore, all their heating and bathing apparatus were clumsy, despite their expensive elegance.

The poorer class of Romans secured heat in a room by building a fire on a stone or brick floor at the end or at one side, the smoke and soot passing out through holes in the roof. In heat results this was not nearly so satisfactory as the center fire in the Indian's tent.

The better homes of our own forefathers were heated in the main living room by a fireplace from six to eight feet wide and so deep that the children could not encircle the logwood fire, but if they would look upward could see the stars through the great chimney. When coal came into use for fuel the size of chimneys was curtailed, but either way the loss of heat was from 75 to 90 per cent.

The Open Fireplace

With the increase of population and the growth of cities and towns, the demand for greater heating comfort arose, and stoves and grates were invented so that it became possible to heat every room in a house. Then was evolved the idea of economizing in labor and fuel by doing all the heating from a central location—hence the furnace, from which heat was conveyed by pipes. Next followed steam and hot water. The five steps in civilized man's efforts toward providing means to keep himself warm in cold weather may therefore be set down as follows:

- 1—Open fireplaces.
- 2—Stoves.
- 3—Hot air furnaces.
- 4—Steam.
- 5—Hot water.

There is nothing more healthful than the open fireplace, but it is always objectionable on the score of wastefulness in fuel—which is true largely of hot-air furnaces and stoves. The latter do their warming in spots. The radiation of heat from fireplaces is from but one side of a room. In a building not well protected from the wind a furnace often gives poor results. The principal deficiency of these three methods of heating is their lack of uniformity in warming power.

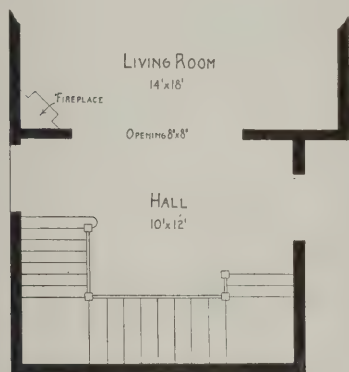
An interesting review somewhat in detail of the reasons for an expected increased consumption of Portland cement in 1913 as compared with the year just closed, are set forth in a comprehensive letter sent out to the trade by the Chicago Portland Cement Company, 30 North La Salle street, Chicago, Ill.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

Finish of Opening between Hall and Living Room of a House

From E. A. L., Presque Isle, Maine.—I come to the Correspondence Department seeking advice from some of the practical readers of the paper. I have a living room 14 x 18 ft. in plan and a hall 10 x 12 ft. with an opening between the two 8 ft. wide and 8 ft. high. I planned to put in a colonnade and at first I thought of finishing it in Mission style. I would like, however, to have some of the readers tell me what will



Finish of Opening Between Hall and Living Room

be the best way to finish this opening and whether to have it plain or molded.

If not too much trouble I would like to have a sketch of a colonnade that would be suitable for an opening of this size and location.

Would it be advisable to panel the hall for a distance say of 2 ft. 10 in. in height?

I am sending a rough plan, and trust some of the readers will give it early attention.

Preventing Tools from Rusting

From L.F., El Paso, Texas.—In regard to the matter of keeping tools from rusting I would say that I have used the following for some time with good results. Take a pint cup—a one-piece cup preferred, as the corners at the bottom are rounded and no dirt will collect—then get a tomato can with a good strong bottom and just the size to slip into the cup. Cut off the can about 1½ in. up from the bottom, then get a sponge that will fit snug into the bottom of the can when dry. Then punch four holes to receive two wires running at right angles to each other through the sponge. Cut the wires flush, and drop solder on the wire inside of the can to keep from coming out.

As regards the amount of oil to be used in the cup, I would say that I select a sponge which when placed in the top or the part made to receive it and saturated with oil, will expand and bring the top even with the top rim of the cup. For general use one filling per week or 10 days will be found sufficient. Use just enough oil to saturate the sponge, as any more than this would cause the sponge to give off more oil than

would be required. I use light machine and kerosene oil in equal parts.

This arrangement has been found very convenient, as it means a saving of strength in framing heavy timbers, for the reason that a saw can be used with little set if kept well oiled.

I would say that I have been a reader of *The Building Age* for some time and think that every craftsman should try and build up the trade by giving ideas through the Correspondence columns in exchange for the suggestions which he receives therefrom.

Knot for Sash Cord

From C. C. H., Brookville, Pa.—Regarding the inquiry of "Carpenter," Sheridan, Wyo., in a late issue of the paper, I will say that of all the different knots for sash cord which have been presented the bowline knot is, in my estimation, the best of all. It is safe and sure, will never come untied, but is easily untied if necessary. I have always used this kind of a knot for sash cord as well as for every other tying where one may want to loosen the knot again. In the March issue of the paper Edward H. Crussell shows this knot in Fig. 1 of the illustrations there presented.

Proper Method of Applying Trim

From D. P. Barry, Redford, N. Y.—Regarding the question of "C. N.," New York City, in the March issue of the paper, I would say that grounds have nothing to do with the warping of the trim. I seldom put on grounds, but when I do I put on a second stud so they will be covered by the trim and serve as a gauge for the plaster. I always use a 2-in. jamb rabbeted as shown in Fig. 1 of the sketches. In the first place, get the studs plumb, especially on the butt side, and key



Fig. 2—Showing Grooves Cut in Trim and Base

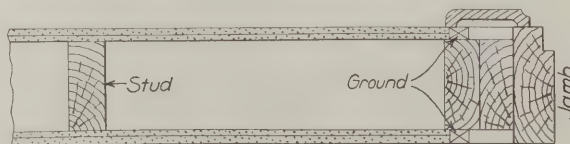


Fig. 1—Showing Manner of Arranging the Grounds

Proper Method of Applying Trim as Suggested by Mr. Barry

the other side plumb. Mortar will not warp a 2-in. jamb.

Run a groove ¾ in. deep on the back of the casing with a fine circular saw and two of them on the base, as indicated in Fig. 2 of the sketches. Treated this way they will never warp.

Finding Lengths and Bevels of Rafters

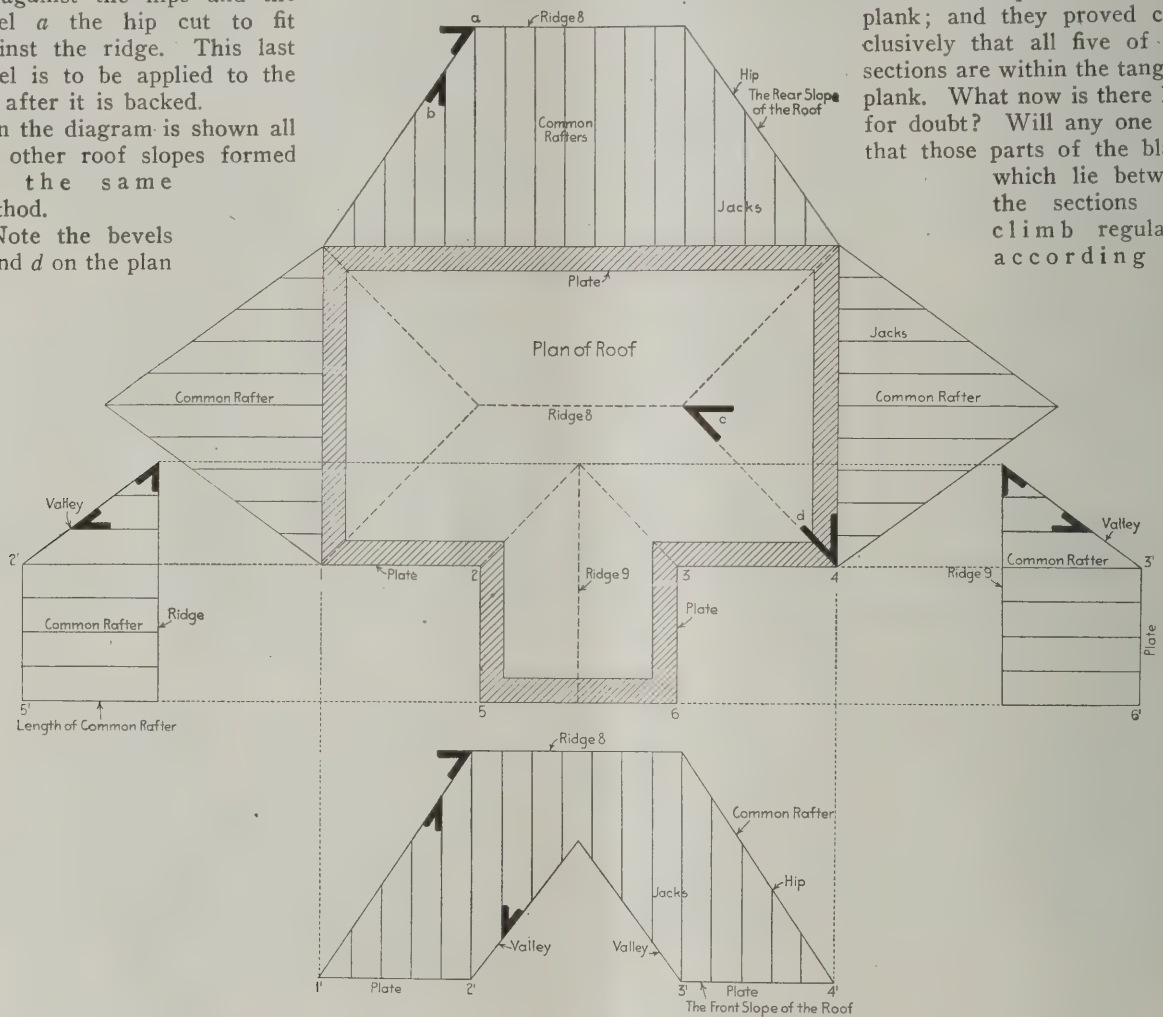
From W. L. M., New York.—In the diagrams accompanying these comments "R. T. W.," Montreal, Canada,

will find a complete answer to his query which appeared in a recent issue of the paper. It will be observed that the method of finding the lengths and cuts of all the roof timbers is simply to resolve the slope of the roof into a horizontal plane.

Take the rear slope of the roof as shown in the diagram for an example. Measure from the plate to ridge 8—a distance equal to the length of the common rafter of the main roof. Make the length of the ridge equal to its plan length; connect the ridge and plate as shown by the slanting lines. The figure formed in this manner represents the slope of the rear roof constructed in a horizontal position, from which the lengths of the rafters, jacks and hips may be measured. The bevel *b* represents the top cut for all the jacks to fit against the hips and the bevel *a* the hip cut to fit against the ridge. This last bevel is to be applied to the hip after it is backed.

In the diagram is shown all the other roof slopes formed by the same method.

Note the bevels *c* and *d* on the plan



Finding Lengths and Bevels of Rafters as Explained by "W. L. M."

line of the main hip. They represent the foot and top cuts of the main rafters.

It may be well to remember that the plan lines of the hips and of the valleys in equal pitch roofs are coincident in length and angle to the common rafters.

Further Comments on Winding Stair Rails

From C. F. S., Brooklyn, N. Y.—The further comments of C. C. Grant which were inserted under the above heading in April and which showed a continued misapprehension of my article in the December issue, must be offered as my excuse for again taking up space in these columns.

It will be seen in the comments referred to that C. C. Grant makes his greatest mistake in his longest paragraph. Referring to Fig. 5 of the December demonstration where a view of the squared wreath in the plank was shown, he errs greatly in mistaking not only its

purpose, but also its importance. It was intended only to illustrate to less advanced readers what had been previously proved by the sections of Figs. 3 and 4. For him it might have been supposed unnecessary, as in no way is it concerned with the establishment of any proof. Less pains than those that were taken to misconstrue the purpose of this illustration would have enabled him, had he so chosen, to perceive the following facts in the December article.

Five sections were taken along the blank at regular distances. The thickness of the plank was found from the lower section in Fig. 3. It was never increased, as C. C. Grant imagines it was, in order to make it contain the intermediate sections. The planes of the sections in Figs. 3 and 4 were made to show the correct and relative positions of the plank; and they proved conclusively that all five of the sections are within the tangent plank. What now is there left for doubt? Will any one say that those parts of the blank which lie between the sections can climb regularly, according to

the helical nature, and yet leap out of the plank? When such has been proved we must believe it, but not before. It may be said that in the practical shaping of such a blank five sections would be ample guidance for the mechanic; more would only hamper his securing an artistic result.

If C. C. Grant would carefully peruse and not merely glance at the demonstration referred to, he should not find it difficult to correct his present misapprehension. It is a mistake to think, as he does, that any conviction on this question can be derived from the instructive article of "Triangulus," which appeared in the issues of *The Building Age* for April and May of last year. The sectional form of "Triangulus" blank is entirely different. Its one-sided character—seen more or less in every cylindrical rail—which would cause the moulding to bulge into prominence on one side and sink partly from view on the other, offers only the greatest contrast, and no comparison to the blank in question.

Now to take C. C. Grant's strongest argument. He tells us in the third paragraph of his comments that it is evident that a blank of certain infinitesimal proportions would leave the demonstration of December still a failure. It must be remembered that merely saying a thing is evident, does not make it so. The most that this argument can do is to make it appear probable that certain cases, far below a practical stage, do not uphold it. If it should ever be proved, then the demonstration will be shown to have been a particular and not a general one.

Probably the tangent plank was never before the subject of so much discussion. It seems that some, who delight in difficult problems, will never forgive the tangent system for being so simple. The reason of this is hard to see. As long as stairways continue to be designed with plans of various curvature, difficult work will be met with in handrails. Should not the simplest means of correctly accomplishing this work seem the most acceptable? The simplicity of the tangent system is manifest to all, but some still think that a cylindrical rail is the only correct one. To suppose that a rail is correct because formed on a cylindrical blank is, however, as great an error as to suppose one incorrect because produced by the tangent system.

Let him who thinks the tangent system too simple to possess any scientific interest, first use whatever science he has in thoroughly comprehending its principles. Take Fig. 2 and Fig. 6 of the December demonstration for examples. Is it easy to discern the principles that



Front Elevation—Scale 1/16 In. to the Foot

Design for a Postoffice Building—Submitted by H. C. Winans, Hood River, Oregon

so simply solve the problems they deal with? Cannot these principles be applied to solve as simply similar problems for every case of rail over circular plans?

These considerations should cause C. C. Grant to see something besides errors in the tangent system. If he continues to cling to his previous idea of the tangent plank's insufficiency, he will convince me that no errors of the tangent system remain for him to fall back upon.

Figuring Cubic Contents of Porches

From P. S., Minneapolis, Minn.—In the April issue of *The Building Age*, page 160, I find an estimate by the cubic foot for a Seashore Bungalow. Now would you or Mr. Weindorf, the author, be kind enough to tell me how the porch has been figured. The article explains how the house is estimated, but I do not quite understand the way to figure the contents of the porch.

I am a constant reader of *The Building Age* and am very much interested in everything which it contains.

Answer.—In regard to the question raised by our correspondent Mr. Weindorf states that in the house in question the porch measures 9 ft. in width with a total length of 81 ft. with an approximate height of 13 ft. Multiplying these dimensions together and tak-

ing one-fourth of the cubic contents gives as a result 2,369 cubic feet.

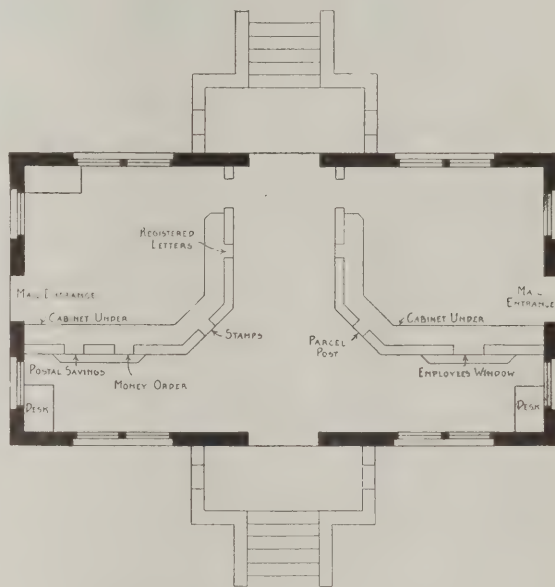
One-fourth of the cubic contents of the porch is taken to cover the roof, floor, foundation, posts, etc., the walls of the house facing the porch being figured in with the house itself.

Draining a Cellar

From D. P. B., Redford, N. Y.—I would say to "O. W.," of Marion, Ind., that he dig his cellar big enough to place a line of tile all around the outside of the bottom of the wall; then lay two or three lines across the bottom of the cellar. If the ground turns out to be wet there will be no other way of keeping the cellar dry, and no time is so good as when he is building his cellar walls.

Design for a Post Office Building

From H. C. Winans, Hood River, Ore.—In answer to the request of "H. P.," Housatonic, Mass., I am



Floor Plan—Scale 1/16 In. to the Foot

sending a plan and elevation for a post office building having a floor space 20 x 40 ft. in area.

An examination of the plan will clearly show the arrangement of the partitions separating the public space from that occupied by the employees of the various departments. The heating may be done by a radiator under each window and in the basement may be located the toilets.

The building itself is to be of light red brick trimmed over the opening and at the corners with concrete brick. The foundation and coping are to be of concrete with pebble dash finish.

Cleaning India Oilstones

From W. D. S., Tullahoma, Tenn.—I note the suggestions of "D. P. B.," Redford, N. Y., in reply to the inquiry of "P. M. H.," Sedalia, Mo., and while it is a good way to clean India oilstones, I do not agree with "D. P. B." in his recommendation to steep in concentrated lye, as the boiling lye tends to soften the cements which are generally part glue and again it is very penetrating. I have used dry clay in a small pan, covering the stone all around 1½ or 2 in. thick and packing the fine clay tightly around the stone. I then put

it in a hot oven with good results and with no damage to the stone.

I knew a carpenter who had a hard Washita oilstone and did not take the best of care of it. As a consequence it became dirty and glazed. He put it in a barrel of soft soap and allowed it to remain there a year. When he got it out it was as white as a piece of chalk and a good medium soft stone. I never buy a hard Washita oilstone, as I understand how to pick them out. Then I soak it in spindle oil for two weeks; make a nice block for it with a cover and use good machinery oil on it. When I have done using the stone I wipe it clean with a piece of cotton waste or a cloth and cover it up. The men all say I have the best stone in the shop. A stone 1 x 2 x 8 in. will soak 2 oz. of spindle oil.

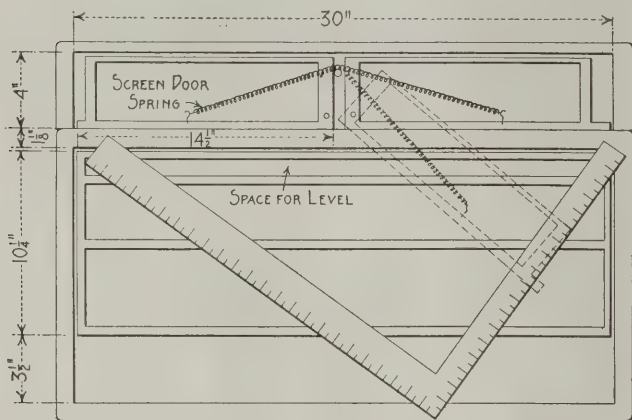
I want to say in conclusion that *The Building Age* is always improving and is now nearly twice the size it

which I designed and built several years ago. It is something of a departure from the ordinary, but I have found it very convenient. Its chief merit is found in the fact that when the lid and till are raised every tool is at hand. The till raises and lowers as easily as the cover.

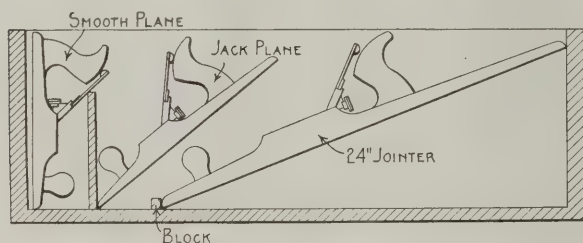
The chest is built of pine 1½ in. thick and dove-tailed at the corners. The cover is 4 in. deep inside and has a partition through the long way. To this is hinged a rack for saws, consisting of a board just fitting the space. On the back of the board are fastened two blocks about 14 in. apart ripped down to receive the saw blades. This holds two saws and two more may be placed behind the rack. The latter is kept closed by a flush cupboard catch.

The space below the saw rack is occupied by four drawers 14 in. long, 3¾ in. wide from back to front and 2¼ in. deep. These drawers are swung on bolts acting as a pivot and are kept closed by a 16-in. coiled screen door spring attached to the upper inside of each drawer. One spring operates two opposite drawers. These also have a flush cupboard catch. The dotted lines in the plan, however, show one drawer open.

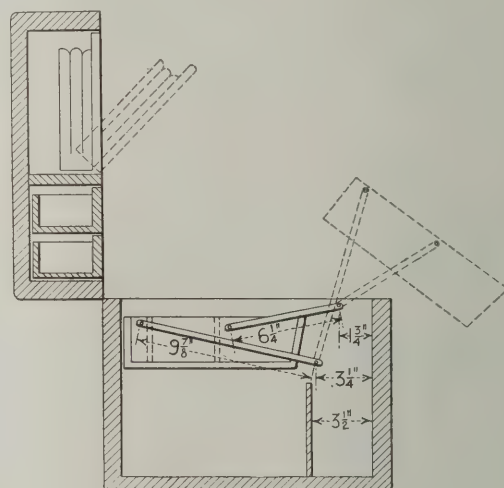
The drawers are made of 7/16 in. lumber except the ends receiving the bolts, which are 7/8 in. The till in



Plan View Showing Position of the Steel Square on Top of the Tills



Section Through Space for Planes



Vertical Cross Section of Tool Chest

Construction of a Carpenter's Tool Chest—Contributed by "W. J. B." of Toppenish, Wash.

was 15 years ago when I began to take it regularly. I have five years' issues in one pile and the other copies are at my son's, who lives near Wilmington, Del.

Building a Stationary Ice Box

From R. W. Y., Toledo, Iowa.—In answer to "W. S.," Hempstead, N. J., I think the article on page 539 of the October, 1912, issue of *The Building Age* would interest him. In his sketch reproduced in the April issue he places the door for icing at one end of the box. I think it would be better in the center.

I notice that the correspondent says he has been a subscriber for 10 years. It seems to me that he does not keep in touch with the articles printed in the magazine. A plan which I follow is to occasionally glance over the back numbers of the paper and I also make a note of articles in the current issue which seem especially valuable to me.

Construction of Carpenter's Tool Chest

From W. J. B., Toppenish, Wash.—In response to the request of a correspondent in a recent issue of the paper I am sending blue prints relating to a tool chest

the lower part is 10¼ in. wide, 29 in. long, 3 in. deep and the top sets 1 in. below the top edge of the chest.

It is swung up at each end on two iron straps 3/16 x ½ in. and of the length shown in the end section, the figures given being to the center of the screw holes. It is brought forward as shown by means of the dotted lines and leaves the whole bottom accessible.

The planes occupy the space in front of the till and are arranged as shown in one of the sketches presented herewith. The 24 in. jointer rests against the block in the bottom of the chest and the jack plane rests over that. In the end is the smooth plane and the rabbit plane. The space under the jointer is used for the plow.

The square clearly outlined in the plan view of the chest rests on top of the till and a notch is cut in the edge where the angle of the square overlaps it.

Constructing an Ordinary Door Frame

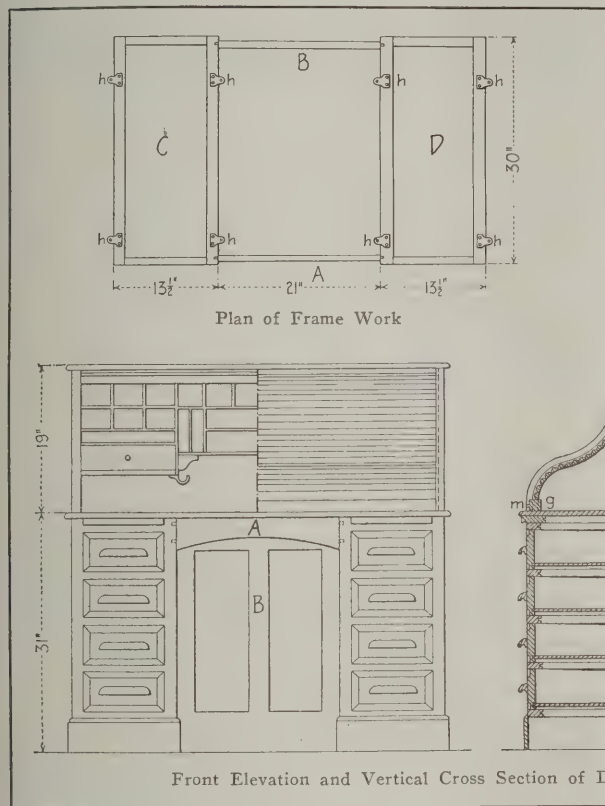
From Builder, New York.—Referring to the inquiry of "W. E.," Brandon, Manitoba, which appeared on page 143 of the March issue of the paper, I would say that I use No. 1 studding for frame construction and No. 2 for stone and brick. Keying can be done better with No. 1 than with No. 2.

Making a Roll-Top Desk

From C. J. M., St. Johns, Newfoundland.—I am sending herewith details of a roll-top desk in answer to a correspondent in a recent issue of *The Building Age*. The drawings show a plan, elevation and cross section with a detail of a device for locking the drawers.

The roll-top as will be seen is made of half round slats firmly glued to a strong cotton cloth backing and made to run easily in the curved groove provided for the purpose. The piece *g* in the section is 3 in. wide and $1\frac{1}{4}$ in. thick. It stands outside the upper shelf when the top is pushed back and is furnished with hand grips similar to those on the drawers. This strip is also furnished with a lock of peculiar design to fasten the top when it is pulled down.

The parts *C*, *D* and *E* are made separately. When setting up, the back panel *B* and the front piece *A*



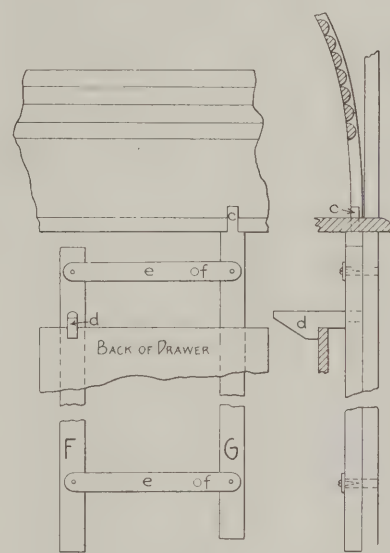
Front Elevation and Vertical Cross Section of Desk

the hooks *d* from the back of the drawers. When the roll top is pulled forward the weight being relieved from the pin *c*, the weight of the piece *F* causes it to fall and the hooks fall over the backs of the drawers, securely locking them.

One thing to be particularly observed in connection with the working of the roller top is to make it run easily in its grooves, also to have exactly the same distance from *n* to *o* as there is from *m* to *n*.

Question in Masonry Work

From D. P. Barry, Redford, N. Y.—I want to say that the example of masonry presented in connection with the communication of "R. H. H.," Rouses Point, N. Y., in the April issue of the paper is not ashler at all and would be very faulty except in thin low walls where the stone could reach nearly or entirely through the wall. As to his Jonah "two-in-one uncoursed ashler," I can find reference to no such ashler in any of my authorities. One says: "We have been unable to find a work on civil engineering describing what you call 'two-in-one' uncoursed ashler." Professor



Details of the Arrangement for Locking the Drawers

Making a Roll-Top Desk—Contributed by "C. J. M.," St. Johns, Newfoundland

shown in the elevation are put in between the parts *C* and *D* where they are held in place with dowels; then the top part *E* is laid on and fastened with screws to the clips *h*. The back of the part *E* and the parts *C* and *D* are divided into drawers and pigeonholes.

At the back of the parts *C* and *D* there is a device for locking all the drawers, and so arranged that when the top is pulled down and locked all the drawers are also locked. This device consists of two pieces of oak *F* and *G* as shown in the detail, kept in place with two iron strips *e-e*. These strips are screwed loosely to the pieces of oak with round head screws and are also fastened to the back of the compartment by means of a loose pin *f-f*. The piece *F* is furnished with hooks *d* made of oak and firmly glued in place. The piece *G* is furnished with a pin *c* at the upper end which passes up through the bottom of the upper compartment *E* in such a position as to come in contact with the roll top when it is pushed back.

When the roll top is pushed back the under edge of it comes in contact with the pin *c* and pushes down the piece *G*. The iron strips *e-e* revolving on the pins *f-f* act as a lever to raise the piece *F*, thus releasing

Merriman, the author of one of the best known civil engineers' handbooks, states that he "does not know what 'two-in-one' in connection with uncoursed ashler means."

To my mind, this "two-in-one" is doubtless some variant of random range ashler, and I may have something to say later on the subject of masonry which may be of benefit to "R. H. H." and many others.

A "Wrinkle" with the Hand Saw

From J. J. W., Evanston, Ill.—It often becomes desirable, as, for example, in the removal of store fixtures, to cut a nail spike or screw, which could not be otherwise removed without damaging the wood or finish. This can be readily done by sawing off the nail or screw if the joint will allow the insertion of a saw.

With a three-cornered file strike the back edge of the saw lightly, making a series of almost invisible teeth; insert the saw and perform the operation with the back of the saw.

It will take a couple of minutes to prepare the saw,

but half a minute's work will cut a 20d wire spike. It is surprising how nicely this "wrinkle" works.

Finding Lengths and Bevels of Hip and Jack Rafters

From W. S. W., Pleasant Ridge, Ohio.—In the sketch Fig. 1 which I send herewith I will endeavor to show "F. S.," Grand Rapids, Mich., what he wants to know. I should plan the plate as shown around one end of the roof, also the ridge board, three common rafters, two hips and one jack. He will see that I give the lengths from the outside of the plate to the center of the ridge board under the point *o* on the plan as at *d* in the elevation.

If the end of the ridge board had the top edge cut off and the corners of the two side common rafters that are inside of the center lines of the hips, on the same slope as the common rafters at the end he would have three inclined planes coming together at the center *o*.

The elevation of the common rafter is shown at *A* and of the jack running part way up. It will also be seen that *a-b* is the run, *a-d* the rise, *a-b-d* the bevel for

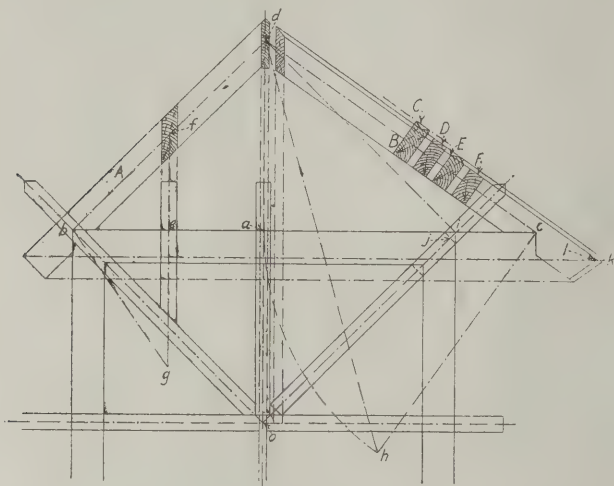


Fig. 1—Diagram Explaining Solution of W. S. W.

Finding Lengths and Bevels of Hip and Jack Rafters

the seat cut, *b-d-a* the plumb cut and *b-d* the length. The jack is the same at *b-e-f* only shorter. The jack has a side bevel which is shown at *f*, the bevel being at *e-g-b*. The distance *e-g* is equal to the length of the jack.

The elevation of the hip is shown at *B*, while *a-c* is the run of the hip which is equal to *i-o*, and *a-d* is the rise which gives the plumb and seat cuts. At *c-d-h* is the side bevel for the hip, *c-h* being equal to the run of the hip.

It will be seen that the hip is a little wider than the common rafter on account of its not having as steep a pitch as the common rafter. The correspondent will see how to get the cut at the bottom end of the hip.

To obtain the backing for the hip, make *k-l* equal to *i-j*, which will give the line to which to back the hip.

If the bottom end of the jack sets on a valley rafter it will have the same bevel as the top end; find the valleys the same as the hips. The section *F* shows the hip when it is not backed and *E* shows it when it is backed. At *D* is shown the valley rafter when not backed and *C* shows it when it is backed.

It does not make much difference about the bottom side of the rafters, but the top side must come as shown so as to make them even with the top of the other rafters. I think the correspondent can readily understand the rest of it. He can lay out a roof of any pitch this way and make any changes that may be necessary.

From James Barry, New York City.—I am sending herewith my method of getting the cuts and lengths of hip rafters, thinking that possibly it may be of interest to some other readers of the paper.

Referring to Fig. 2 draw *A-B* equal to one-half the width of the job. Draw *B-C* as the height above the plate and then *A-C* will equal the common rafter for that width of building. The foot cut is at *A* and the head cut at *C*.

Now prolong *B-C* to *D* and make *B-D* equal to *A-C*. Then *A-D* will be the length of the hip with the head cut at *A* and the foot cut at *D*.

The head and foot cuts for jacks are the same as for the common rafter.

The lengths of all jacks will be found by laying off on *A-B* the position of the jack rafters; then make *E-F* parallel to *B-D* and connect *A-B* and *A-D*. The length will be represented by *E-F* and the angle at *F* will be the edge cut.

Sometimes valley rafters are required, in which case lay off on *A-B* the entire width from the foot of the

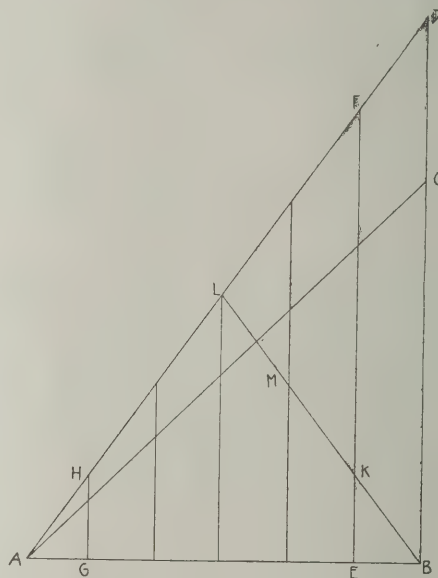


Fig. 2—Diagram Submitted by James Barry

hip to the foot of the valley rafter. Now with the same angle as *A-D* lay off *L-B* equal to the length of the rafter desired. The foot cut will be found at *B* and the head cut at *L* the same as for the hip at *A* and edge cut at *L*.

Cripple rafters will then equal *K-F*, etc., with cuts for foot and head the same as the head cuts for the common rafters and edge cuts the same as for the jacks. As cripple rafters have no level cuts all cuts are the same as the head cut for common rafters.

From C. H. S., Painesville, Ohio.—In response to the request of "F. S.," Grand Rapids, Mich., in the March issue, I submit Fig. 3 showing the method which I have used for years in obtaining lengths and cuts of hip, valley and jack rafters. The line *A-A-A* represents the outside of the building; *D-K* the run of the common rafter; *B-B* the center line of building and *D-B* the length of the common rafter; *K-E* the rise of the common rafter; *A-K* diagonal and run of hip; *K-G* rise of hip the same as the rise of the common rafter and *A-G* the length of the hip. The lines marked *J-J-J* give lengths of the jacks. The angle at *A* gives the level cut of the hip; that at *G* the plumb cut of the hip; at *D* the level cut of the common rafter and of the jacks; at *E* the plumb cut of the common rafter and jacks; at *F* the top cut at the top end of the jacks; at *H* the cut for side of roof board, plancier and edge of

facia, and at *I* the edge cut of roof board, plancier and side of facia.

The lines 1-2, 2-3 and 3-4 show the method of obtaining the backing for hip rafter. It will be seen that the line 1-2 is drawn at right angles to *A-G*; that 2-3 is at right angles to *A-C*, and that 4 is located with the dividers. Connect 3 and 4 and the angle at 4 is the angle for backing as shown at 5.

I have found this as easy as any to understand and as correct as any that I have ever seen. I am glad that I can give it to our friend "F. S."

From J. T. Brown, Osgood, Ind.—Replying to the inquiry of "F. S.," Grand Rapids, Mich., in the March issue of *The Building Age*, I will endeavor to explain in the simplest way I know the method of drafting a roof. To obtain the length of jack rafters is a very simple process and may easily be ascertained by means of a diagram as shown herewith.

Referring to Fig. 4, lay off to scale one-half the width of the building to be dealt with as from *A* to *B*; the length of the common rafter *B* to *C*; the length of the hip rafter from *A* to *C*, and space off the width

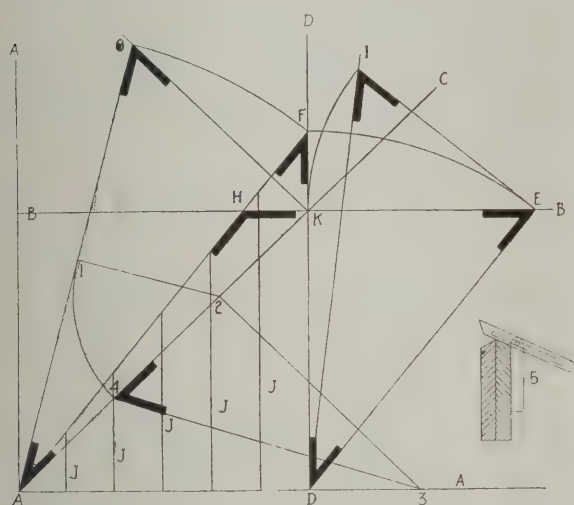


Fig. 3—Diagram Accompanying Letter of "C. H. S."

Finding Lengths and Bevels of Hip and Jack Rafters

from jack to jack rafter as shown by the lines 1, 2 and 3. Measure them accurately and then the lines 1, 2 and 3 will be the exact length of the jack rafters.

In the division any number of jack rafters may be laid off this way and the result will be the correct length of each rafter no matter what may be the pitch of the roof or the distance the rafters are apart.

Figures for determining the lengths of jack rafters for the three common pitches are here given. For one-quarter pitch they cut 13.5 in. shorter when spaced 12 in. on centers; they cut 18 in. shorter when spaced 16 in. on centers, and they cut 27 in. each time when spaced 24 in. on centers.

For one-third pitch they cut 14.4 in. shorter each time when spaced 12 in. on centers; they cut 19.2 in. shorter each time when spaced 16 in. on centers, and they cut 28.8 in. shorter each time when spaced 24 in. on centers. For one-half pitch they cut 17 in. shorter each time when spaced 12 in. on centers. They cut 22.6 in. shorter each time when spaced 16 in. on centers, and they cut 34 in. shorter each time when spaced 24 in. on centers.

I will now give some things which can be accomplished with the square—the greatest instrument with which the "chip" has to work. I will for convenience take a one-third pitch roof, although of course any pitch can be framed just as easily. The broad rule is simply to construct with the square such a triangle as will proportionately and correctly represent the full

size. The blade becomes the base, the tongue the altitude or rise, while the hypotenuse that results represents the rafter. The necessary cuts are shown by the tongue and blade respectively.

To frame one-third pitch roof with the steel square proceed as follows: We will suppose the roof to consist of common rafters, hips, valleys, jack rafters and ridge. Let it be assumed that the building measures 30 ft. from outside to outside of wall plate, the toe of the rafters to be fair with the outside wall plate, the pitch being one-third; that is, the roof rises from the top of the wall plate to the top of the ridge one-third of the width of the building or 10 ft., the half width of the building being 15 ft. It is thus the figures on the square are obtained. If other figures are used they must bear the same relative proportion to each other.

To get the required length of the material measure across the corner of the square from the 10 in. mark on the tongue to the 15 in. on the blade, which gives 18 ft. (calling inches feet) as the length of the common rafter.

To obtain the bottom bevel or cut to fit on the wall plate, lay the square flat on the side of the rafter and start say at the right hand end with the blade of the square at the right, the point or angle of the square away from you and the rafter with its back, or what will be the top edge of it when it is fixed, toward you. Now place the 15 in. mark of the blade and the 10 in.

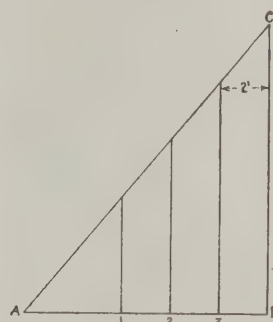


Fig. 4—Diagram Submitted by J. T. Brown

mark of the tongue on the corner of the rafter that is toward you, still keeping it laid flat, and mark along the side of the blade. This gives the bottom cut and will fit the wall plate.

Now move the square to the other end of the rafter, place it in the same position as before to the 18 ft. mark on the rafter and to the 10 in. mark on the tongue and 15 in. mark on the blade. Then mark along the side of the tongue which will give the top cut to fit against the ridge.

To obtain the length of the hip rafter take the 15 in. mark on the blade and the 15 in. mark on the tongue of the square and measure across the corner diagonally. This gives $21 \frac{3}{16}$ in. Take this figure on the blade and 10 in. on the tongue and measuring across the corner gives the length of the hip rafter; or take the 17 in. mark on the blade and the 8 in. mark on the tongue and run it just like the common rafter. Mark along the side of the blade for the bottom cut and move the square to the left as many times as there are feet in half the width of the building—in the present instance 15 ft.—keeping the above mentioned figures in mind 17 in. and 8 in. in line with the top edge of the hip rafter. Step it along just the same as when applying a pitch board on a stair string and after moving along 15 steps mark along the side of the tongue, which will give the top cut or bevel and the length. The reason 17 in. and 8 in. are taken on the square is that 12 in. and 8 in. represent the rise and run of the com-

mon rafter to one foot on the plan, while 17 in. and 8 in. correspond with the plan of the hips.

To get the lengths of the jack rafters proceed in the same manner as for the common or hip rafters or alternately space the jacks and divide the length of the common rafter into the same number of spaces. This will give the length of each jack rafter.

To get the bevel of the top edge of jack rafter take the length $14\frac{3}{8}$ in. of the common rafter on the blade and the run of the common rafter on the tongue, apply the square to the jack and mark along the side of the blade which will give the bevel or cut. The down bevel and the bevel at the bottom end are the same as for the common rafter.

To get the bevel for the side of the purlin to fit against the hip rafters place the square flat against the side of the purlin with 8 in. on the tongue and $14\frac{3}{8}$ in. on the blade; mark along the side of the tongue which gives the side cut or bevel. The $14\frac{3}{8}$ in. is the length of the common rafter to the one foot run and the 8 in. represents the rise.

For edge bevel of purlin lay the square flat against the edge of purlin with 12 in. on tongue and $14\frac{3}{8}$ in. on blade; mark along the side of the tongue which will give the bevel or cut for the edge of the purlin.

The rafter pattern must be cut half the thickness of the ridge shorter and half the thickness of the hip rafter allowed off the jack rafter.

The above is a mere drop in the bucket as to what can be accomplished by this wonderful instrument, the steel square, if one only knows how to apply it. I wish to say right here in concluding this letter that not 5 per cent. of the craft can read the steel square intelligently and it is very essential that this reading of the square should be thoroughly mastered in order to become proficient in the craft. While I am deficient in this matter I would advise all beginners to make the steel square a special study so that when a young man goes on the job he can pick up his square and frame any kind of roof that comes his way or anything else that is framable, as the steel square never makes a mistake although lots of workmen do. It is, therefore, very essential that proficiency be acquired.

Advice to the Ambitious Carpenter

From D. P. Barry, Redford, N. Y.—I want to say a few words to "R. L.," Winona, Minn. I am going to talk as one old enough to look back, young enough to look ahead, and one who has had to build the ladder before climbing it. In 1895, fresh from the university, I was building a depot at Breckenridge; went from there to teach in the high school at Albert Lea; worked in Minneapolis the same summer and have been only two winters out of the school-room since; have done my share of building each year and own and carry on a farm as a sort of experimental station—experimenting to see how long I can carry on the farm and keep out of the poorhouse. I have attended two academies, two colleges and three universities and have two degrees. These schools are situated in Kansas, Nebraska, New York, New Hampshire and Connecticut. I have been three times to the trans-Mississippi and twice across the continent. I was foreman on a great railroad before I was 22 years old, when I set out for college, where I spent an hour a day at the carpenter's bench. From that time on I earned all my expenses with my saw and plane. I have two of the three first planes I bought and my first bevel is still fit for service.

My advice to "R. L." is: Go and do likewise; only don't take so long nor attempt so much. Start right in on Civil Engineering, especially the drawing, and architectural drawing and allied topics. If you can't

go six months in the year, go three months. You will get more good in the class room in one hour than a week of correspondence work. Run up to Minneapolis; walk along that beautiful oak avenue across the river by the campus; go thru the great university buildings; look thru the great library. Ask for the president; tell what you want. Ask for Prof. Nicholson, Chemistry; he was a schoolmate of mine at the University of Nebraska. Ask for Prof. McLean. He used to be Chancellor of University of Nebraska. They may be there. Spend five or six years this way; no matter how poor you may be or how hard the fight. What a different world you will find. If there is anything in you they will bring it out. If you are overestimating yourself they will bring that out also; but you will learn a great many things. You will learn to respect the country carpenter, architect and engineer. You will find that the whole rural world is rumbling ominously with transformation and evolution—wonderful works waiting for engineers yet unborn.

I keenly remember my first concrete experience on that same railroad; it was a crude, ephemeral job. I was not the responsible party. But many years afterwards I was sought out to do some real concreting on another great railroad. What a wonderful advance! So let "R. L." prepare for things he has never heard of. I had never seen nor heard of a concrete chimney, but I devised a handsome and enduring chimney after one failure. I took my stone hammer and knocked it to pieces and threw it out the window.

Ambition should be made of stern stuff, and well equipped.

Finishing Window Frames of Oregon Fir

From W. S. W., Pleasant Ridge, Ohio.—I would recommend to "F. H. S.," Athol, Mass., whose letter appeared on page 145 of the March issue of the paper, that he try a scraper, as I am inclined to think that will do the work. Of course a scraper does not work so well on soft wood but he can cut against the grain with it and make it smooth.

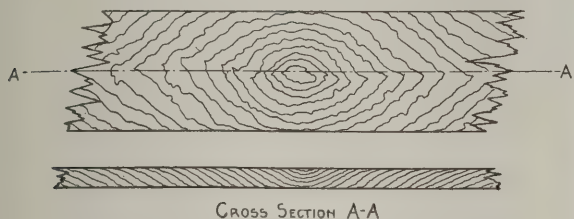
If he has never used a scraper it will take some time to learn how to sharpen it and properly use it. When in good shape it will cut a thin shaving like a strip of tissue paper. I never used any Oregon fir but I suppose it is something like cypress. If it is I would not use a scraper only where I had to on account of the grain.

From A. A. T., Portland, Ore.—In reply to the query of "F. H. S.," Athol, Mass., I would suggest that in order to smooth Oregon fir, especially what is termed "slash grain," requires good tools and a thorough mechanic to back them up. It is also necessary that the wood be thoroughly seasoned, must be free from sandpaper dust, etc. One of the best instruments to use in operating upon this wood in order to reduce it to a smooth surface is the gauge plane, using the smoothing plane size. These planes when properly sharpened and set are capable of going against the grain.

The common little steel scraper when in proper condition will also be of assistance in smoothing rough places. After smoothing with either a plane or scraper it is advisable to use a little fine sandpaper to take out the plane marks.

From G. H. W., Denver, Col.—Replying to a question of "F. H. S.," Athol, Mass., in a recent issue of the paper, I would say that the cover of the smoothing plane should be set not more than $1/64$ th of an inch back from the edge of the bit for smoothing Oregon fir. I have found my old beechwood smoothing plane with $2\frac{1}{4}$ in. heavy (Butcher) bit with cover set very close, the best plane for smoothing this or any other gnarled wood and little need for a cabinet scraper left.

From W. S. C., Pasadena, Cal.—Referring to the inquiry of "F. H. S.," Athol, Mass., which appeared in the March issue of the paper, I think he will find that the best way to smooth up those places where the grain runs in two directions in Oregon fir lumber is to take a good sharp scraper and work both ways from the center with the grain. The accompanying sketch will



Finishing Window Frames of Oregon Fir

show what I presume "F. H. S." means, and it is quite prevalent in slash grain Oregon pine.

Who Makes Byrkit's Lath-Board?

From J. A. K., Connellsville, Pa.—Can any one tell me where I can get Byrkit's patent sheathing lath-board? It is a lath-board with dovetailed grooves and quite common in the trade many years ago.

Home-Made Waste Paper Press

From E. G. H., Atchison, Kan.—Will some reader furnish an illustration and description of a home made waste paper hand baler or press suitable for baling waste paper.

Problem in Handrailing

From C. F. S., Brooklyn, N. Y.—In response to "A. E. K.," Lowell, Mass., who asks for the best solution to a problem in handrailing I send him what I consider the simplest and trust that he will have no difficulty in following it. The methods given in the May issue of *The Building Age*, page 219, in connection with the article "Evolution of Handrailing" might also be applied to this problem. He should compare them and choose for himself the best.

Referring to the accompanying sketches, first draw the plan of the quarter circle and tangents and unfold the left-hand tangent A to A on the base line. Erect three perpendiculars as shown, which will limit the development of tangents in elevation. As his plan shows three risers from springing to springing the height of a riser taken three times must be set up from A to 3.

Now "A. E. L." will see that before he can draw the tangents in elevation, some consideration must be given to the easings. Here the pitch of tangents must of necessity be very steep in comparison to that of the straight rail. Easings are accordingly introduced to avoid the abruptness of the sudden changes in the pitch of the rail and in this case they have been made to terminate $1\frac{1}{2}$ in. below the point 3 and $1\frac{1}{2}$ in. above the point B. Between these points, determined, the tangents are drawn, their elevation being a straight line and at either extremity the joint of the easing is made at right angles to this line. Next trace the easings from the joints into the straight rails.

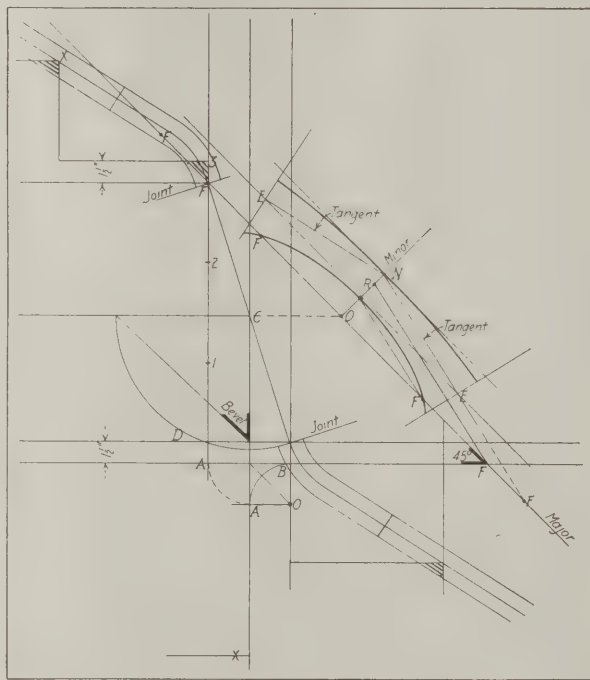
The finding of the face mold is determined by drawing the level line F-D through the center of the lower joint and then laying down the major axis line at 45 deg. to it, which must pass through the center of the upper joint—a point $1\frac{1}{2}$ in. below 3. Thus has the direction of the major axis been laid down. As the

chief line of an ellipse it has been found first. By producing the level line through C to intersect it at O the center of ellipse is next found. Draw the line of the minor axis square to the major and set off on it two points equal to the radius and the diagonal of the plan. The semi-minor axis O-R having been determined, it is necessary in order to find the correct ellipse to now either the length of the semi-major axis or the distance of a focus from the center. The latter presents itself. The point F, the center of the upper joint or topmost point of the tangents, is a focus and F below where the level line D intersects the major line, is another.

With a string attached to pins inserted at these points, if an ellipse were drawn through R the semi-minor axis a part of it would stand vertically over the center line of plan and form with its axes a plane in which the tangents of the part would lie at the same pitch and be the same length as in elevation.

The practical value of the points F F is that they enable us readily to find the foci for the inner and outer curves of the mold. For this set off each side of R half the width of the rail and draw two lines parallel to a line which joins R and F to intersect the major line. These intersections may be transferred to the other side of the center and the curves traced.

To insert the tangents in the face mold make a line parallel to the major line and distant from it equal to half the diagonal of the plan. Take the length of a tangent as radius, the point of junction N as a center



Problem in Handrailing—Diagram submitted by "C. F. S.," Brooklyn, N. Y.

and find E-E. Mark the tangents and make the ends of the mold square to them.

To find the bevel, set the compasses in C and describe an arc to touch the lower joint and end on the level line C.

The city of New York will spend more than half a million dollars for a large storage house which is intended for the Supply Bureau of the Board of Education. It will cover a plot 200 x 109 ft. on First avenue, extending from Sixty-seventh to Sixty-eighth streets, and will have a facade of brick, limestone and terra cotta. It will be six stories in height and has been designed by C. B. J. Snyder, the architect of the board, who estimates the cost at \$550,000.

ESTABLISHED 1879

THE BUILDING AGE

Formerly CARPENTRY AND BUILDING

Copyright, 1913, by David Williams Co.

Entered at New York Post Office as Second Class Mail Matter

Published Monthly by the

David Williams Company
239 West 39th Street New York

W. H. Taylor *President and Treasurer*
Chas. G. Phillips *Vice-President*
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Subscription Rates: To all parts United States and Mexico, \$1.00 a year; to Canada, \$1.25 a year; to all other countries, \$2 a year.

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Standardizing of Building Codes

That the standardizing of building codes would be of great help to architects, builders and engineers in their work of designing and erecting all classes of structures is the conviction of many of those prominently identified with building construction in leading cities of the country. The point is made that there is no particular reason why every city should have a different unit value for steel, because it is well known that structural steel as now manufactured is very uniform in its quality and strength; neither is there any more reason for the differing unit values or methods of calculating the strength of reinforced concrete construction; likewise for the strength of various types of masonry construction, and it is almost as true of the various forms of timber construction. The classification of buildings according to Building Inspector V. D. Allen of Cleveland could be standardized for all cities and this in itself would simplify and unify building codes materially. Four ways have suggested themselves by which this co-operation could be brought about. First, a national organization of inspectors or commissioners of buildings to hold a meeting at stated periods; second, a similar organization omitting meetings and conducting its work by some system of correspondence; third, to get some engineering or architectural journal to establish a department to handle this kind of matter and request officials of various cities to give information concerning their work; and, fourth, to add to the annual reports of the inspectors or commissioners of buildings, information of this nature in accordance with a general understanding among them.

Accident Prevention

As the season for activities in the building trade gathers headway and with laws in force and being enacted in different states increasing the liability of employers for accidents which disable workmen, much attention is being paid to liability insurance, as it now enters materially into the cost of work. This cost must naturally be met in the price made to clients and should be embodied in the percentage added to cover overhead expense. This has led to a considerable search into ways and means of reducing this cost to the lowest safe limit. Another phase which might be considered of paramount importance is the effect of this new responsibility on the prevention of accidents. In most instances, liability laws have provided that those who are exposed to the risk must also exercise greater care in the prevention of accidents than has been practiced when there was no restraining influence. This operates to reduce expense and is an equally powerful influence for vigilance on the part of the workman. It has been pointed out by some observers that the provisions of liability laws have been of great educational value in bringing to the attention of workers the risk attending the character of employment in which they are engaged. Such laws have also brought to the notice of workmen different simple means that only need to be observed to provide a practically complete protection. It has been of advantage to employers to

acquaint their workmen with these details and their efforts in this direction have been strongly supplemented by the representatives of the workers who have been as vigilant in seeing that employees are familiar with conditions which will enable them to secure protection in case of accident. To some students of this situation it appears that as great good comes to the body of workers from the avoidance of accidents as from the provision made for the workers and their families during a period of incapacitation from accidents.

Forward Step in Factory Ventilation

A movement that has been maintained in New York State for several years partly culminated when Governor Sulzer signed ten bills designed for the betterment of conditions in industrial establishments. These bills were recommended by the commission appointed to gather information on what was demanded by the people, engineers and various organizations interested both in the protection of the health and comfort of factory workers and to avoid unnecessary expenditure for equipment. The commission gave many hearings, also conducted many investigations and received substantial assistance from a committee of the American Society of Heating and Ventilating Engineers. The different new laws affecting factory workers provide among other things for the better ventilation of factories and removal of impurities and excessive heat, better fire protection, better housing for employees under sanitary conditions, for cleanliness in and around factory buildings, for the formulation of rules and regulations to protect employees by the State Industrial Board, for the physical examination of children, for the prevention of draughts and the provision of sanitary wash and locker rooms in foundries, for the provision of regulations for the construction, equipment and operation of elevators and machinery for greater safety, and for fire alarm signal systems under specified conditions. At present the new laws are only available in copies of the bills that were prepared for the legislators but before they go into operation there will be no difficulty in becoming familiar with their provisions. It is a common experience that all that is desirable can seldom be secured in a new law and doubtless it will be found necessary to keep up the movement that has accomplished this much so that it can be supplemented by further legislation to supply the deficiencies.

The Seventh Chicago Cement Show

Although somewhat early to talk about another Cement Show, it is interesting to note that the Coliseum at Chicago has again been leased for a period of nine days for the Seventh Annual Cement Show, which will be held February 12 to 21, 1914. The period during which the show will continue is longer than has heretofore been the case, but as there will be only one Cement Show next season, it is felt that larger benefits will be derived by extending the usual time two days longer than hitherto. While the exhibition will be conducted along the same general lines as in the past, a number of changes have been adopted.

The space units have been increased in size, while the rates for space have been decreased.

With the announcement of the Seventh Chicago Cement Show comes a bulletin from the National Association of Cement Users, Harrison Building, Philadelphia, Pa., giving the place and time for the Tenth Annual Convention as Chicago, February 16 to 20, 1914. The holding of the Cement Show and Convention in Chicago at the same time means an unusually large gathering of concrete interests in February next.

Our Cover Design for July

The subject of our cover design for next month will be a suburban residence with walls constructed of hollow tile, stucco finish and with a dark-red shingle roof. The type of house is one which we are quite sure will interest a large class of readers both by reason of the arrangement of the rooms and the treatment of the exterior.

The first floor arrangement provides a large living room from which rises the main flight of stairs, a study, a dining room and a kitchen. On the second floor the arrangement comprises three sleeping rooms, a sewing room and bathroom.

While the first cost of a house constructed of hollow tile is a trifle more than one of frame, yet it will be found cheaper in the end by reason of the lower rates of insurance, greater durability and the requirements in the way of repairs being reduced to a minimum.

The London Building Trades Exhibition

The biennial Building Trades Exhibition which has just been held in London, England, has marked very clearly the advance which is being made on the other side of the water in building material and builders' ironmongery. During the last few years there has been a decided tendency to erect buildings on the American principle, and steel and concrete have entered very largely into all constructional work. Architects are relying on expanded metal for their division walls, and are specifying for metallic fixtures.

At the Exhibition in the large hall at Olympia some very interesting contrivances were on view, and the advanced use of metal in Great Britain was evidenced. It was also very patent to all that the importance of good class decoration is being realized by British builders and architects. The paint and color men exhibited a keen rivalry for place, a great number of them having erected artistic kiosks and stands which they had painted and enamelled with their several preparations. There were impenetrable enamel paints with a beautiful gloss; houses showing the effect of "Solignum," a timber preservative; and Fuller's "Antirot"; and numerous waterproof cements for the contractor. Rubber tiling and paving was in evidence, and some marvelous imitations of marble were shown.

Britishers continue to prefer the open fire on the hearth to the closed-in stove, and although much advance has been made in heating the newer stoves and grates carry out the idea of the fire on the hearth and, if not realistically, at any rate imitatively continue the tradition. The embellishments of tiles and hand-made bricks enhance the beauty and the decorativeness of the grates, and these modern specimens of wall tiling are used as framing for the kitcheners and cooking ranges, whether they are heated by coal, gas or electricity. Some of the old styles of British grates have been reproduced by such firms as the Carron Company of Scotland, with good effect, and many of the Scotch

houses had very beautiful grates and stoves on their stands.

Builders' ironmongery was very much in evidence, and many of the beautiful products of the United States were shown, for many of the clean castings and artistic designs of American iron founders are found on the shelves of British ironmongers. One London firm made a conspicuous exhibit of wrought-iron work, testifying to the popularity of the one-time common craftsmanship of the village blacksmith. There are many examples extant in England, both in museums and in the old houses, which show the skill with which the craftsmen of old worked.

The building of new houses on earlier models and styles has taxed the ingenuity of the hardware artist, but the success which has attended his more recent efforts was fully demonstrated at the Olympia Exhibition.

Internal fittings which were once made exclusively of wood in Great Britain are now very largely supplemented and superseded by metal. An instance of how this affects building construction was made clear by an exhibit of "Shawcar" patents, shown by a Birmingham firm. Their exhibit included metallic fittings for schools and colleges, such as have been installed in many universities. There were metallic lockers for students and for use in workshops and a great variety of factory fittings, metallic shelving, wire partitions for warehouses, and improved structural metal work for all kinds of buildings.

Ventilation has made great advance during the last few years, and one of the exhibits was that of the "Ozonair" apparatus for the purifying of air in commercial buildings. There was also an exhibit of "Permutit," a process for the scientific softening of water for industrial uses. There were ladder supports to enable workmen to operate in difficult positions, and there were tar-spreading machines for the modern roadmaker.

The great point, however, gained by the exhibitors was the demonstration to the public that specialization in the manufacture of building supplies, and expert knowledge of the best thing to supply were necessary in present-day trading. There has been a tendency recently in Great Britain to inquire carefully into the processes of manufacture, and many of the merchants handling American hardware show anxiety to discover the leading qualities of the goods they are selling, so much so that American makers are advised to make their booklets and the literature they send over to England as explanatory as possible. Quality of workmanship as well as of material, coupled with economic use are desirable attributes of all goods shipped from the States to a country where quality and lasting excellence are regarded as of first importance.

Death of Daniel Simonds

The many friends of Daniel Simonds, President of the Simonds Mfg. Company, Fitchburg, Mass., will learn with deep regret of his death, which occurred on Sunday night, May 4, at the age of 65 years. While in New York two months ago Mr. Simonds was taken ill and was removed from the hotel to his summer home at Larchmont, N. Y., where he died.

Mr. Simonds was born in Fitchburg, September 18, 1847, and acquired his education in the public schools of that place and at Comer's Commercial College in Boston. After leaving college he went to work for his father in West Fitchburg, making edge tools and scythes. In 1868 the Simonds Mfg. Company was incorporated and the plant moved from West Fitchburg to its present location. In the early eighties Mr.

Simonds was made superintendent and vice-president of the company, and in 1888 he succeeded George F. Simonds as president.

In pursuance of his vigorous business policy the company branched out from Fitchburg and plants were installed in Chicago, Ill. and Montreal, Canada. The company also has works at Lockport, N. Y., and branch houses in the leading cities of the United States and Canada and one in London, England.

Mr. Simonds was the father of the co-operative industrial system of education at the high school which has widely advertised Fitchburg throughout the country. He took a deep interest in this system of education which has been most successful.

Chicago's Latest Skyscraper

Excavation for the foundations has just been commenced for a new 15-story store and office building which will rise at the southwest corner of North Michigan Avenue and East Washington Street, Chicago. It will have a frontage of 96 ft. on the avenue and 162 ft. on the street, will be constructed of steel with exterior finish of African marble and bronze for the first three stories. Above these the exterior will be of old ivory colored terra cotta. The plans, which have been prepared by Jarvis Hunt, architect, call for a structure estimated to cost \$1,500,000. It will be known as the Michigan Avenue Building, and is expected to be ready by the first of April, 1914.

It will be constructed on what is known as the "open plan" and will include some unique features, the most important of which is the elimination of the so-called inside office, there being no inside court. The open court will start above the third floor with an area of 42 x 56 ft.

The first four floors will be used for high class retail shops, while the upper stories will be devoted to offices for physicians and affiliated professions.

The New Ohio Compensation Law

The new workmen's compensation law in Ohio which will go into effect January 1, 1914, and which is known as the Green law, enlarges the scope of the present law which has been in effect about a year. The most important feature of the new law is that it makes it compulsory for all employers of five or more persons either to operate under its provisions by contributing to the State insurance fund, or to provide insurance for their workmen by having benefit funds of their own or by maintaining with others mutual insurance associations. It is left optional with employers of less than five persons whether they insure under the law. Under the present law it is optional with all employers, and only a small percentage have paid into the State insurance fund. The new law prohibits employers from carrying insurance with liability companies.

Employers who carry their own insurance must have sufficient financial ability to render certain the payment of compensation and the State Liability Board of Awards is given general supervision over the employers who thus elect to carry their own insurance and is given authority to require security from such employers to insure the payment of damage claims. When employers carry their own insurance compensation, payments must equal those paid by the State in similar cases. Those who carry their own insurance must pay into the State fund 10 per cent. of the premium that they would be required to pay if they were insured by the State. Another change in the existing law requires employers to pay all the State insurance premiums. The present law provides that the employer shall pay 90 per cent. of the premiums and the employee

10 per cent., but most employers have paid the full amount.

Employers who either come under the law or who have their own insurance fund are exempted from damages at common law or by statute except in cases where injury or death has resulted from the willful act of an employer or his agent or their failure to comply with laws for the protection of employees. In this case the law provides that none of its provisions shall affect the civil liability of such employer, and an injured workman may, at his option, claim compensation under the law or institute suit for damages. If an injured employee applies for an award or accepts compensation from an employer, he waives his right to bring suit. However, if the State board of award denies him an award he still has the right to bring suit in the courts.

For temporary disability the employee will receive two-thirds of his average weekly wages, but not over \$12 or less than \$5 a week as long as the disability

ment to dependents in case the injury results in death within two years.

As under the present law, insurance rates are fixed for the various industries and provision is made for readjustment every six months should the payment made in a particular industry warrant a raising or lowering of the rate.

Stone and Frame House in the Blue Ridge Mountains.

A most interesting example of the picturesque effects which may be produced by the use of cobblestones in building construction is illustrated in the house appearing upon this page and which represents a type of construction employed to a large extent in the Blue Ridge section of Virginia. The entire first story up to the belt course, the outside chimney, the porch columns and base as well as the foundations are of native



A Stone and Frame House in the Blue Ridge Mountains—Miss H. G. Brouse, Architect, Washington, D. C.

continues, and for not to exceed six years, or \$3,750 altogether. In case of partial disability, he is to receive two-thirds of the impairment of his earning power during the continuance thereof, but not more than \$12 a week and not to exceed \$3,750. For permanent total disability he will receive two-thirds of his average weekly wages, not to exceed \$12 or less than \$5 a week, for life.

The new law provides a schedule of awards for disability for certain specific injuries which, under the present law, are left largely to the judgment of the board of awards. These provide for the payment of two-thirds of his weekly wages, not to exceed \$12, for a specified number of weeks. Among the injuries named and length of time the payments are to be paid are the following: Sixty weeks for loss of thumb; 35 weeks, first finger; 30 weeks, second finger; 20 weeks, third finger; 15 weeks, fourth finger; 150 weeks, hand; 200 weeks, arm; 125 weeks, foot; 175 weeks, leg; 100 weeks, eye. The loss of both hands or arms or both eyes or any two of these members is to be considered permanent total disability. Provision is made for pay-

ment to dependents in case the injury results in death within two years.

The house represents a design by Miss H. G. Brouse, of Washington, D. C.

New York City's First House

The old landmarks of New York City are so rapidly disappearing that their sites are being marked by tablets. Aldrich Court, one of the office buildings of the older type in lower Broadway, covers the site of what is said to have been the first structure erected by a white man on Manhattan Island. At No. 41 Captain Adrian Block built four huts. This settlement preceded the Dutch colonists who came to establish a trading post in the new world.

Landlord Fails to Stop Smoking Chimney

A case of interest to builders was recently decided by the New York Court of Special Sessions in which a landlord sought by invoking the power of the City Health Department to protect his tenants from the smoke of a chimney on a neighboring dwelling. The defendant 27 years ago built a home on West Eighty-third street, New York City, and two years ago the plaintiff erected on an adjoining site a nine story apartment house. Realizing that the neighboring building would interfere with the draft of his chimney, the defendant wrote a letter to the plaintiff requesting him to place hooks in the wall of his apartment house to which flues might be attached to connect with the chimney of the defendant's dwelling, but the request was ignored by the plaintiff.

After the nine story building was completed the tenants were annoyed by the smoke from the neighboring chimney. Thereupon the plaintiff wrote to the defendant demanding the abatement of the nuisance. The plaintiff also complained to the Board of Health, which sent to the defendant a notice of violation of the health ordinance. The defendant consulted counsel who wrote to the board asking for precedents and received a reply in which counsel was referred to the Corporation Counsel, who cited the sanitary code. As this did not appear to cover the case, the defendant's counsel wrote to the Corporation Counsel, asking to be referred to any court decision covering the points in question. The answer was a summons for the defendant to appear in a police court. The defendant was held for trial at the Court of Special Sessions and was under arrest for some time until bail was secured.

In its decision, the Court holds that the owner of a four-story private house using it in a reasonable way and having fires for cooking cannot be compelled to carry his chimney five stories above his roof or fifty stories above his roof simply because an adjoining owner pleases to erect a nine story tenement house or a skyscraping office or loft building alongside.

Novel Feature in Constructing Houses

When the various groups of model homes for wage earners constructed of reinforced concrete poured in steel molds and located at Nanticoke, Pa., were in course of construction a rather novel method was employed in connection therewith. A temporary railroad was laid around the entire group of buildings and a mixing plant and elevator mounted on a flat car with a carload of cinders and sand at one end and a carload of cement at the other. This train moved from house to house as the pouring was completed.

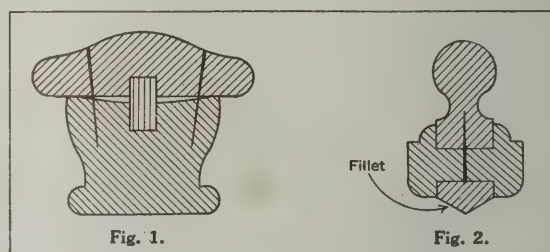
When the system of steel plates or molds, which were conceived by Milton Dana Morrill, a well-known architect of Washington, D. C., were put up in unit sections and locked together they formed a trough around the walls and partitions into which the concrete was poured. The floors and roofs were cast by the same system.

When the 55-story Woolworth building was formally opened on the evening of April 24, the 80,000 electric bulbs which light the structure were set aglow by President Wilson pressing a button at the White House in Washington. The occasion was unique in that it was the first time in the history of the country a President of the United States had officiated in the opening of a commercial structure. The architect was Cass Gilbert and the builders were the Thompson-Starrett Co.

Construction of Rigid Stair Rails

There are doubtless many mills which make a business of furnishing house trim and stair building material which have had more or less trouble in making the stair rails and rendering them perfectly rigid and satisfactory. The one-time-method of working the stair rail out of a single heavy piece of 3 x 4 in. stuff is not always satisfactory for a great many such pieces show a tendency to spring after being worked and a large percentage of crooked pieces is the result. By making the rail in two pieces, says a writer in a recent issue of the *Woodworker*, practically all straight stock is secured and one can also make up extra-long lengths when desired without having a butt joint all the way through.

Use is made of the accompanying patterns for stock. In Fig. 1, which represents a cross section of a rail, the top member is worked out of 5/4 stuff, while the bottom member is worked from 8/4. The bottom member should be hollowed out slightly in order to permit the top member to fit closely at the edges. Both members should be plowed to easily receive a piece of 1/2 x



Construction of Rigid Stair Rails

3/8-in. slip tongue and they should be fastened with 2-in. wire-finish nails.

For a 1 3/4-in. square-end baluster the pattern indicated in Fig. 2 of the sketches makes a good rail. Both these members are worked from 8/4 stuff, nailing up through the bottom member into the top as indicated. By reversing two slightly sprung members of top and bottom one secures a straight piece of rail.

New York Tenement-House Construction

The tenement-house construction, in Greater New York during the first quarter of 1913 shows an increase as compared with the same period last year. The total number of tenements for the first quarter of 1913 is 537, with a total estimated cost of \$17,772,000, as compared with 501 and a total of \$16,629,000 for the corresponding months of last year. Manhattan planned 59 as against 47; the Bronx, 129 as against 153; Brooklyn, 214 as against 242; Queens, 135 as against 58 last year for the same quarter, which shows that Manhattan and Queens are doing better than last year. In Manhattan the total is \$6,656,000 as compared with \$5,285,000; the total in Queens \$1,154,000 as compared with \$60,000, the latter figure representing the estimated cost of all the tenements for which plans were filed during the first quarter of 1912.

In demolishing the wreck of the Marquam Building, in Portland, Ore., referred to in these columns a short time since, all Pacific Coast records were broken. The work was completed in the space of two weeks without an accident of any kind, and everything is now ready to commence upon the new 12-story structure which will rise upon the site. It is estimated to cost \$750,000, and will be constructed of reinforced concrete.

ARCHITECTS SHOULD UNDERSTAND MILL DETAILS

Thickness of Stock When Dressed—Details Should Be So Made
That the Mill Man Can Use Them to Advantage



At intervals in the past we have presented in these columns more or less reference to mill-work and the difficulties often experienced by millmen in carrying out specifications owing to their ambiguity or to the total absence of some important details. A phase of the subject which should receive the serious attention of those interested in bringing about a better understanding between the architects and the millmen is discussed in a recent issue

of the *Wood-Worker* by John Wavrek, Jr. We present the following extracts: Practically every mechanic connected with the woodworking industries, and especially with the planing mill, is well aware that the majority of the so-called architects lack very much in the execution of practical details. I do not wish to say their detailing is executed badly, or does not look well—that is, in style and proportion—but I mean that most of them are not practical from the standpoint of the planing-mill man.

One will almost invariably find in the average details that the thickness of a doorjamb or sill is shown 2 in. exact, or a window seat will be drawn 1 in. exact. Then, again, a door is detailed $1\frac{1}{2}$ in. or $1\frac{1}{4}$ in. An outside casing of a skeleton frame is shown $1\frac{1}{4}$ in. Very frequently cornice members—that is, the frieze or moldings—are drawn 1 in. exact, and so on.

Now, if the architect had worked in a mill sufficiently long to have gotten some practical knowledge as to how thick the different kinds of wood can be worked when dressed, I am sure he would not put down such impractical details. It should be well known that it is not possible to dress 1-in. stock on both sides to more than $\frac{7}{8}$ in., and $1\frac{1}{4}$ -in. stock will only work to $1\frac{1}{8}$ in., while 2-in. stock is almost always dressed to $1\frac{3}{4}$ in. when finished.

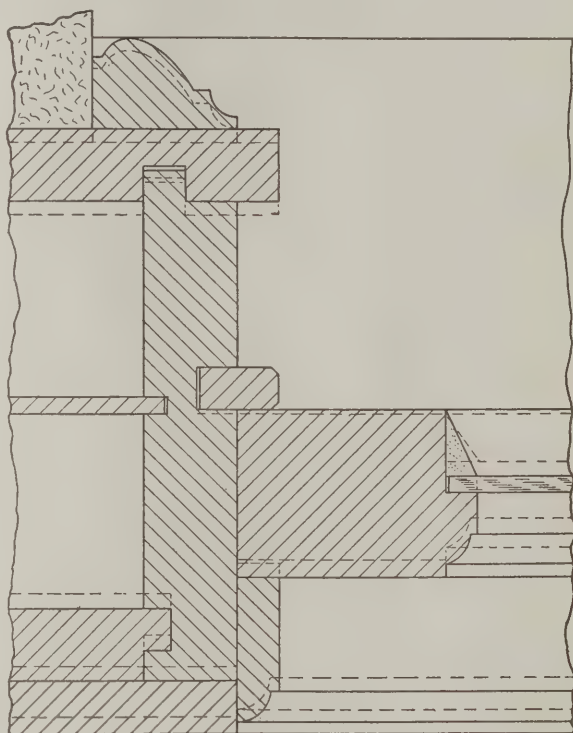
Of course, the architect might say he could not afford to sacrifice his design or the outline of certain moldings, on account of $\frac{7}{8}$ in. of wood, more or less. However, it seems to me he would be greatly benefited by making the sacrifice, because contractors would certainly demand his work in preference to the other fellow's, who will not depart one particle from his theory.

If one can believe half the statements which are discussed in the papers and magazines relating to the scarcity of lumber and the necessity of conservation of the forests, it would certainly be of great benefit to dispense with some theory, and use, instead, a little common sense, added to good judgment, and make details so that they can be used by the millman to advantage, besides relieving him of a lot of swearing about the draftsman who insists on drawing 1 in. when $\frac{7}{8}$ in. would have answered the same purpose. Also, it would be no serious matter to substitute $1\frac{1}{8}$ in. for $1\frac{1}{4}$ in. or $1\frac{3}{8}$ in. instead of $1\frac{1}{2}$ in., and so on along the whole register of sizes.

An illustration showing how very troublesome a wrongly detailed piece of work can become, is the following (and let me assure you it is almost invariably the case): The architect draws up details of frames for a certain building. These frames are shown in sec-

tion through side and head, having drawn in a 2-in. sash. When the mill foreman inquires of the draftsman whether it is positively necessary to have 2-in. exact sash, he will probably say that it does not need to be strictly 2 in., but that 2-in. stock should be used. This at once changes the detail because of the fact that there is a difference in the thickness of the stock, which only holds out $1\frac{3}{4}$ in., as stated before. This being the case, you must of necessity change the detail to conform with the requirements. The pulley stile, head and sill have to be narrower and the sash beads wider. The accompanying sketch probably illustrates the case better than a description.

If the detail is not changed, then the machine man who runs the stock will be liable to make a very costly



Partial Horizontal Section Through Box Window Frame—The Heavy Lines Show Faulty Construction; the Dotted Lines the Practical

mistake and it becomes necessary to run the stock over again; this has happened more than a few times, to my knowledge.

Again, there are others of the architects who are familiar with the sizes of stock and will detail a $1\frac{3}{4}$ -in. sash, but very seldom make any allowance for play, of which there should be about $\frac{3}{32}$ in. for each sash, to allow easy working. In this case, also, it would be necessary to change the drawing, for the reason that the pulley stiles, head and subsill would be too narrow and the sash stop too wide. This error we also find quite frequently.

In my estimation, it would be greatly to the benefit of the architect if he would get the necessary data from the lumber people, also a number of stock moldings which the large planing mills have on hand. By thus working with the mill, a great deal of trouble could be avoided and a state of harmony would prevail

among all concerned; besides, it would be of great advantage to both mill and architect.

I would not say for an instant that the draftsman should sacrifice his plan for the reason that a mill might not have the cutters to make a mold exactly as drawn, for in some cases this would detract much from the architect's scheme; however, in the ordinary run of buildings, it would certainly be very practical.

No doubt it would be of great value to the young aspirant for architectural prominence if he were to do practical work in the different branches of planing-mill work, and also serve some time with a prominent contractor in erecting buildings, thereby getting valuable information and experience, which would lay the foundation of a successful architectural career. I know of men who have had this practical experience, and it is a pleasure to set out and figure on work of their designing and detailing, because they know the requirements of the work, and consequently execute it right.

Within the last few years so-called architects have sprung up like mushrooms over night; in fact, every Tom, Dick and Harry who can hold a T-square and sharpen a pencil to make straight lines with, and who draws up some apology of a building design, will sign his name very prominently and in fancy lettering as a full-fledged architect.

Most of these geniuses can only execute with instruments, and when there is any occasion to do some free-hand work, it hurts one's eyes to gaze upon it. Some of your readers may think I have overdrawn the facts, but let me assure them, if anything, it is putting the matter very lightly. I have ample occasion to see these products because it is in the line of my work, and I handle plans of a great number of these would-be architects.

Causes for Cracking of Painted Surfaces

A painter who asked as to the general causes for the cracking of painted surfaces and whether it is possible to detect the causes by the effect, is furnished the following information by the *Painters Magazine*: The causes for the cracking of paint are manifold. Formerly the most common cause was the use of boiled oil in priming that was in vogue some years ago. Priming with cheap ocher or cheap white lead, so-called, that had not a trace of white lead in it, was another cause. Unseasoned or poorly dried lumber used in buildings is another reason for the cracking of paint. This refers to outside painting mostly.

On interior work the cracking of paint is due mostly to the kiln-dried or green lumber, to green or hot walls, inferior size or imperfectly dried undercoats, always providing that the finishing paint is properly made and well balanced for the purpose.

As to determining the cause from the effect, we would say that when paint cracks with appearance of an alligator skin it may be assumed that the wood may have been green or the undercoat not hard enough, or if in a wall, the sizing was imperfect, even if apparently hard to the touch, or that the wall was too hot for sizing and painting. This effect will show in deep ridges, or rather furrows.

Fire cracks are of a different nature. These appear in spots only, and extend from this spot in fine lines in all directions, similar to the crack in a glass or mirror that has been struck by a pebble or bullet. These cracks are due to contraction of the finishing coat, brought on either by excessive temperature or inelasticity in the material itself.

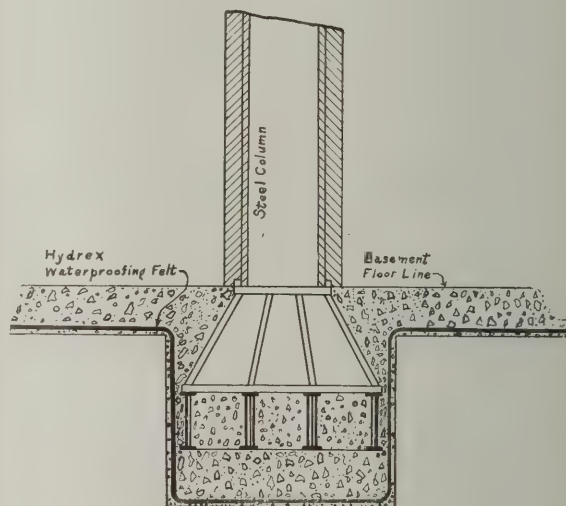
When a plastered wall such as, for instance, that in a kitchen or in a laundry, is repainted without being first washed down with soap and water and thoroughly rinsed, and shows, after painting, large furrows in the new paint, it is not necessarily the fault of

the paint, but the grease on the wall, that does not permit the new coating to obtain a proper hold on all of the surface. A very large volume could be written without exhausting the subject.

Insulating vs. Water and Electrolysis

Embedding steel in concrete may or may not endanger the steel, depending upon whether or not moisture reaches the steel. Concrete is not an insulator or a protection against electrolysis. The evidence and result of tests furnished should at once settle the use of coatings, washes, and concrete mixtures to protect concrete against moisture and the steel embedded therein against electrolysis, another word for corrosion. Exposed steel is always open to minute inspection. What action embedded steel intermittently in contact with moisture is undergoing we do not know because we cannot see. We do know that if it is not perfectly dry it certainly is not improving. The solution lies in the perfect insulation—away from all moisture and electrolysis—of steel, of concrete under certain conditions, and of all building foundation materials.

In the case of the Singer Building, New York, owing to the great depth to which the foundations were carried, special care was required in insulation. To pro-



Insulating vs. Water and Electrolysis

tect the base of the steel columns they were filled up to the level with the top of the shoe plates with "Hydrex" compound which was made of such a consistency that it would remain permanently elastic and tight to the steel so that air and moisture would be excluded. All the exterior walls and entire sub-basement floor including foundations of engines, dynamos, floors under safe deposit vaults, elevator pits, sidewalks, etc., were waterproofed with several layers of felt cemented together with a hot compound in accordance with the "Membrane Method."

The method used in the Singer Building has also been used in insulating the columns and foundations of other large New York buildings. It is of the greatest importance that the materials designed for the purpose of waterproofing possess certain essential properties. The requirements of the felt are that it must be tough and durable, and at the same time soft and pliable. The cementing material must be of such a nature that it will absolutely repel water and moisture and be unaffected by it.

According to a recent insurance report, the total annual fire loss of school buildings in the United States and Canada is between \$3,000,000 and \$4,000,000.

HOW TO BUILD A STORM-PROOF HOUSE

A Development of the Tornado Which Recently Visited a Section of the Central West with Disastrous Results

AS a consequence of the terrible havoc wrought in the Omaha residential district by the tornado that visited the city on Easter Sunday, the Omaha "Bee," in a recent edition, gave its readers advice as to the erection of a storm-proof house that would withstand, to a great extent, such another tornado. Besides giving instructions as to the materials that might be used to advantage in construction, a sectional elevation, reproduced herewith, was presented. Constructive recommendations were as follows:

"The dimension lumber should be of the size shown on the detailed elevation and should be of No. 1 yellow pine, free from knotholes. All rough flooring should

the damage would have been very slight. Many houses were carried from their foundations for want of anchorage."

Supplementing the above it may be stated that the house should be anchored to the foundation walls by $\frac{3}{4}$ -in. anchor bolts placed not over 4 ft. on centers and extending down into the foundation wall 2 ft. There should be a $3 \times 3 \times \frac{3}{8}$ -in. angle iron flush with the top of the floor joist for the anchor bolt to pass through and the joist should be bolted tight to top of wall.

The foundation walls should be of rubble stone laid in Portland cement mortar mixed in the proportion of one part cement to two parts clean river sand—no lime.

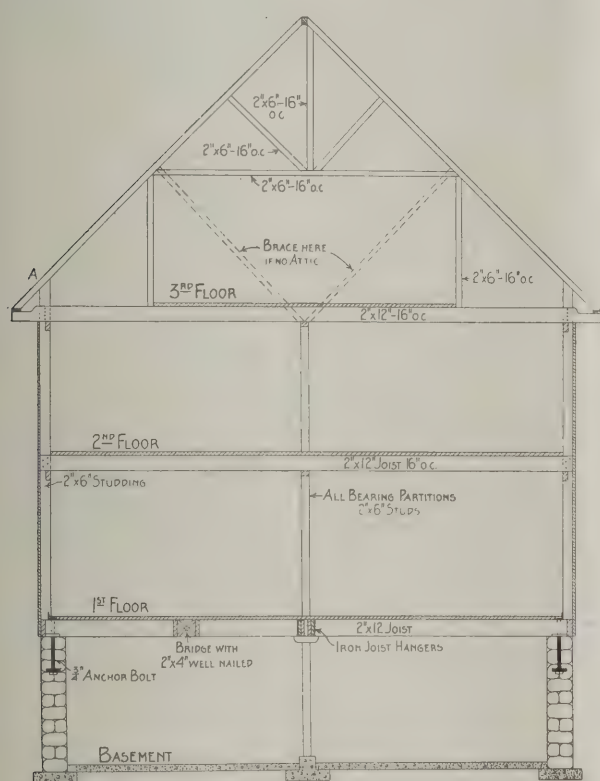
The posts in the basement supporting the first floor joists should be 8×8 in. and placed not over 9 ft. on centers. The first floor joists should be 2×12 in., placed 16 in. on centers and iron joist hangers should be used where joist is supported by basement columns.

All outside studs should pass down beside the floor joist to the wall plates and be well spiked to joist and headers, four nails to each stud, 20-penny nails being used. All bearing partitions should be 2×6 -in. studs.

All rough floors should be laid diagonally of 8-in. lumber. Where the side wall studs intersect the rafters they should be well nailed with 20-penny nails as at "A."

The rafters may be 2×6 in. placed 16 in. on centers for a shingle roof and 2×8 in. for a tile roof.

Where no third floor is used the 2×12 -in. joist shown on the elevation may be displaced by 2×8 -in. joist, but the roof should be braced the same as shown.



How to Build a Storm-Proof House—Vertical Section, Showing Proposed Construction

House Exteriors of Stucco on Metal Lath

One of the drawbacks to the more extensive use of stucco for private residences has been attributed to the additional cost of this type of building over the usual wood construction. It has been the practice to follow the same methods of construction for both types except that in the stucco house, metal lath and stucco are substituted for the weather boards of the ordinary frame house. In a recent Bulletin issued by the North Western Expanded Metal Company the following comments on the subject are presented:

There has been a type of stucco house developed by the architects of New England that has proven economical and satisfactory in every respect. In this type the usual sheathing, building paper and furring strips are eliminated by applying the metal lath directly to the outside of the wood studding.

To secure a thick exterior wall and to add strength there is a coat of back plaster applied to the inside of the lath before putting on the interior lath and plaster. There have been some objections raised to this type of building on the score that leaving off the usual sheathing will reduce the strength of the building. It is found that buildings erected in this manner are not affected by strong winds to the same extent as are the usual wood constructed buildings under the same conditions.

What is known as the "Architects Building," recently described in these columns, was formally opened on the first of May. Among the tenants is a long list of well-known architects and builders of the city.

be of 1×8 yellow pine laid diagonally across the floor joists and nailed with two 10-penny nails in each joist. All splicing in the floor to be made on a joist.

"All side wall rough boards should be of 1×8 -in. yellow pine with two 10-penny nails to each wall stud.

"The roof sheathing, if for shingles, should be of 1×6 -in. yellow pine laid with 2 in. of space between boards. Each board should be nailed with two 10-penny nails to each rafter. If for tile or slate roof the sheathing should be laid tight.

"There should be a large stone chimney, laid in Portland cement, at each end of the house. (One chimney of brick laid in cement properly anchored will help to hold the house, but two large stone chimneys add great solidity.) The chimneys should have iron anchors at each floor and at roof. It would be well to have one chimney at the southwest and one at the northeast corners.

"If this kind of construction had been used in Omaha

New Publications

Cabinet Making.—By J. H. Rudd with chapters by C. A. Zuppann and Walter K. Schmidt; 210 pages. Size $6\frac{1}{4} \times 9\frac{1}{4}$ in. Profusely illustrated with line drawings. Bound in board covers. Published by the Grand Rapids Furniture Record Company. Price \$1.50.

Without doubt this is one of the most interesting and practical contributions to the literature dealing with the principles of designing, construction and laying out of work for the cabinet maker which has recently been brought to public attention. The matter has, however, been prepared to meet not only the needs of the cabinet maker—the manufacturer of household furniture—but the demand which has recently been created for a simple and concise textbook on cabinet making for the use of the increased number of teachers in manual training, technical and trade schools. The matter was first published in the *Cabinet Maker* of London and almost simultaneously in the *Furniture Manufacturer and Artisan* of Grand Rapids. The appreciation with which the articles were received was such as to result in the matter being issued in book form.

The object of the volume is to describe and illustrate pieces of furniture in which difficulties of construction occur and which involve the introduction of mechanical devices not encountered in every-day practice. While making no claim to being a work on design the author points out that it does deal fully with the whole process of manufacture, embracing factory planning, estimating and cost, the measuring of rooms, drafting, setting out, seasoning of timber, veneering and the construction of various types of panelling.

While the work has been prepared by an English author, various chapters have been adapted to American practice. The chapter on cost accounting introduced by Mr. Zuppann is particularly designed for use in manual and technical schools where cabinet making is being taught. The standard sizes of furniture, etc., have also been adapted to the practice in the United States and other chapters have been introduced by Mr. Schmidt on the construction of fuming boxes, intended for both small and large establishments.

The work is comprised in 42 chapters and covers a wide range of articles. The chapters on the construction of writing desks, bookcases and roll-top desk will be found of special interest in view of the discussion relating to these articles which has been in progress in our columns. The use of the Doric, Ionic and Corinthian Orders of architecture occupy a chapter, these being the three which are of special interest to the cabinet worker and joiner. Mantels, china closets, clock cases, tables of various kinds, sideboards, etc., are all considered in a way to prove of the greatest practical value to the mechanic.

Engineering of Shops and Factories.—By H. G. Tyrrell; 399 pages. Size 6×9 in. Illustrated with numerous line drawings and half-tone cuts. Bound in cloth covers. Published by McGraw-Hill Book Company. Price \$4.00.

Architects, engineers, draftsmen and students will find in this book a practical discussion of the important problems of design and detail in the branch of engineering work embraced in its title, written from the standpoint of the engineer of experience. The book is not burdened with mathematical formulæ, and is more of a discussion of present day practice than an attempt to lead the student through the mazes of the field of design. The architect and builder engaged in moderate cost building construction will find of value the chapters on Concrete Surface Finish, Selection of Building

Type, Wood and Steel Framing, Comparative Cost of Wood, Reinforced Concrete and Steel Buildings, Roofs and Roofing, Factory Heating, Air Washing Systems, Factory Lighting, Drainage of Industrial Works, Estimates, and Construction. The last two chapters mentioned are especially helpful to those who desire to become familiar with present methods.

The Concrete House and Its Construction.—224 pages, and 159 illustrations. Published by the Association of American Portland Cement Manufacturers and distributed by the Universal Portland Cement Company. Price \$1.

The primary object of this work is to show the advantages of concrete for construction of dwelling houses as well as of buildings of various kinds. The architectural design and treatment of concrete houses are given careful consideration and then follows a chapter on the details of construction. Other portions of the work are devoted to calculations for determining the strength and design of reinforced concrete in house construction, also calculating the bending moments for reinforced concrete beams and slabs and the determination of size and reinforcement. There are tables for designing reinforced concrete construction and full explanation as to their use. Not the least interesting feature of the work is the chapter on concrete block houses.

Death of J. B. King

J. B. King, one of the founders of the New York Builders Exchange, died on April 22 at Cranford, N. J. He was born on September 29, 1854; was educated in Providence, R. I.; and in 1876 organized the firm of J. B. King & Co., manufacturers and dealers in plaster, in which business he was active until about 3 years ago when he retired owing to ill health, leaving the affairs of the firm in charge of his two brothers, George R. King and Jerome A. King, who had been associated with him since the founding of the business. He was a member of the Downtown Association, the Metropolitan Club, the New York Yacht Club and the General Society of Mayflower Descendants. He leaves a widow, one daughter and two sons, one of whom is in business at 17 State Street where the company's offices are located, and the other is a student at Harvard University.

Separate Contracts in Building Construction

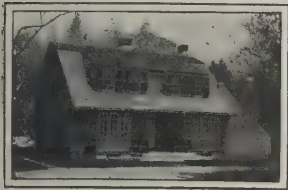
The law commonly known as the "direct contract law" has been put in force in Pennsylvania by the approval on May 1 by the Governor of that State of the act reading: "That hereafter in the preparation of specifications for the erection, construction and alteration of any public building, when the entire cost of such work shall exceed one thousand dollars, it shall be the duty of the architect, engineer or other person preparing such specifications to prepare separate specifications for the plumbing, heating, ventilating and electrical work, and it shall be the duty of the person or persons authorized to enter into contracts for the erection, construction or alteration of such public buildings, to receive separate bids upon each of the said branches of work and to award the contract for the same to the lowest responsible bidder for each of said branches."

Building operations in Erie, Pa., the first three months of the current year were appreciably in excess of those for the corresponding months of 1912, the figures being respectively \$342,581 and \$270,991.

WHAT BUILDERS ARE DOING

Bird's-Eye View of Building Situation in Leading Cities—Estimated Value of the Projected Improvements

THE reports which reach us for the month of April covering building operations in leading cities of the country present a most interesting study. Heavy decreases in some sections are offset by equally important increases in others, and taking the country over one counterbalances the other to such an extent that the amount of vested capital involved through the permits issued in April is only about 5 per cent. less than that for the corresponding month last year. The tendency however is toward contraction, as may be seen by contrasting the figures from month to month since the first of the year with those of corresponding periods in 1912. In some sections there would appear to have been an amount of building considerably in excess of immediate requirements and as a consequence there is now a lull in the erection of structures of certain kinds. This applies perhaps more especially to buildings intended for business purposes, as the amount of dwelling house construction continues upon a large scale, due to the steady growth of the country and the replacing of houses wiped out by fire and the elements.



Notable increases during April occurred in San Francisco, Newark, N. J., Chicago, Baltimore, Nashville, Buffalo, Omaha, Toledo and Peoria, while a heavy shrinkage in the value of the building operations as compared with a year ago are seen in New York City, Atlanta, Denver, Albany, Louisville, Minneapolis, Philadelphia, St. Louis, Seattle, Hartford, Conn., Chattanooga, Tenn., Richmond, Va., Scranton, Pa., and Paterson, N. J.

For the first four months of the present year the value of the building improvements for which permits were issued is practically the same as that for the corresponding months of 1912, the difference being only about 1 per cent. in favor of the current year.

While there were no important strikes on May 1—the date at which new schedules usually go into effect—there has developed more or less friction in certain sections, which is tending to retard building operations and interfere with what promised earlier in the year to be an active building season.

Atlanta, Ga.

At the annual meeting of The Builders' Exchange held on May 8 officers were elected as follows:

President.....F. J. Cooledge.
Vice-President.....J. T. Rose.
Treasurer.....C. G. Bradt.

Secretary J. D. Wood reported a prosperous year for the organization, although building conditions are not as lively as those which prevailed last year.

A loss of 62 per cent. for April, 1913, is recorded, as compared with April last year, in the value of improvements for which building permits were issued, with a total of \$427,185, while the first four months of the year show a loss of 25 per cent., the total being \$1,681,311.

Birmingham, Ala.

The number of building permits issued in April was 382, with an estimated cost of \$296,235, this being an increase of nearly \$100,000 over April last year when 317 permits were issued.

The Builders' Exchange of Birmingham with headquarters in the Chamber of Commerce Building, has just been distributing its Builders and Buyers' Guide containing a classified directory of the membership of the organization. The classifications are arranged in alphabetical order as are also the names under each. There is a list of the executive officers and directors for the ensuing year, a statement of the object and aims of the organization, together with a list of standing committees for 1913. Interspersed among the pages are the announcements of concerns associated with the building and allied industries.

Chicago, Ill.

Building statistics for the year to date show the local situation to be in good shape. The activity in the "Loop" district is most pronounced and transactions in the outlying districts, particularly on the north and south sides, have been the source of discussion.

April this year shows a slight falling off in the number of permits issued as compared with April last year but the amount of money involved exceeds 1912 by 33 per cent. April, 1913, is credited with 1,339 permits with a

frontage of 39,990 ft. at a cost of \$12,329,900, and April, 1912, produced 1,416 permits, with frontage of 37,924 ft. and an estimated cost of \$9,345,400.

Among the prominent undertakings is that of the People's Gas Co. covering the erection of a new gas plant to cost about \$30,000,000. The initial investment will amount to \$6,000,000 and calls for the erection of a main structure about 800 ft. long, 120 ft. wide to be of steel and brick and absolutely fireproof. In all there will be six or eight buildings, the entire plant covering about 200 acres. Plans, specifications and bids are being received and contracts will probably be executed before July 1.

Several school buildings and additions will be erected to cost several hundred thousand dollars. A. F. Husander being the architect in each case.

Holabird & Roche, Chicago architects are preparing plans for the erection of a 16-story office building to be erected for the Mossler Company of Chicago at Thirteenth and Grand streets, Kansas City, Mo. The cost will be \$1,000,000. For the Chicago Club Auxiliary Association they are preparing plans for the erection of a 7-story club-house, garage and hotel to be located at Michigan avenue and Twenty-second street, and cost \$500,000.

A 13-story office building will shortly be erected at 105-109 N. Dearborn street to cost \$350,000. It will be 57 x 80 ft., plans of which are being prepared by G. J. Knisely.

The Central Terminal Railway will erect a three-story brick freight house in the Twelfth street district to cost \$200,000, the contractors being Leonard Construction Co.

William Gauger, architect, is preparing plans for a handsome theater at the northeast corner of W. Monroe street and S. Fortieth avenue, to cost \$150,000.

An 11-story office building will be erected after plans by D. H. Burnham & Co. at the southeast corner of Quincy street and S. Fifth avenue, a "Loop" district location, to cost \$250,000.

Work will shortly commence on a church to be known as St. Mary's-of-the-Lake, which will have a tower 145 ft. high and 22 ft. square. The cost is to be \$180,000. Henry J. Schlacks is the architect.

A 7-story and basement building of "mill construction" will be erected at W. Superior and Kingsbury streets to cost \$225,000. Paul Gerhardt prepared the plans.

Permission has been granted Marshall Field & Co. for

the erection of a 12-story brick retail store to be located at 128-136 N. Wabash avenue. D. H. Burnham & Co. are the architects. The cost is placed at \$900,000.

Cincinnati, Ohio

At the present writing, May 12, local builders and architects are more interested in the solution of existing labor troubles than anything else. The Building Employers' Association was organized with the sole object in view of protecting contractors against sympathetic strikes. To-day practically all work was abandoned, and there is no settlement in sight between the warring factions.

During April, 1238 permits were issued, with the approximate cost for improvements placed at \$693,205. For the same month last year 1206 permits were issued, with the estimated valuation placed at \$947,485. However, there is a gain of nearly 16 per cent. in the total for the first four months of 1913 against same period last year.

Cleveland, Ohio

New building work in this city continues to come out in good volume. During April there were 1,348 permits issued for new buildings to cost \$1,880,065. Of these 254 were for frame buildings to cost \$723,650; and 71 were for brick, stone and steel buildings to cost \$890,000. There were 1,023 for additions and alterations, estimated to cost \$266,415. Among the new building work that came out during the month is the Museum of Art, the erection of which has been pending for several years. This will be a monumental building.

The Cleveland Builders' Exchange has completed plans for its annual summer outing. The members of the Exchange and their families will leave Cleveland on the new steamer *Seeandbee*, Monday, June 23, for Buffalo, N. Y., from where they will go on a special train to Niagara-on-the-Lake, where they will stay until Thursday at the Queens Royal hotel. On their return they will spend a part of a day at Niagara Falls.

The annual banquet and dance of the Builders' Exchange occurred at the Hotel Statler on the evening of Thursday, April 17, when something more than 200 members and their friends attended. George A. Rutherford, president of the Exchange, was toastmaster, who in a humorous vein introduced the speakers of the evening. The principal "talks" were by Mayor Baker and W. S. Hayden, president of the Chamber of Commerce.

Interspersed with the speaking and the dining was a musical program. Forest J. Dresser was chairman of the entertainment committee and was ably assisted by E. A. Roberts, secretary of the Exchange and by a committee consisting of H. M. Terrell, W. A. Fay, John H. Thompson and Ira S. Gifford.

Among those in attendance was James Young, said to be the oldest builder in the membership and still as "young as the most fledgling member."

Dayton, Ohio

While building operations assume an entirely different aspect from what they did a month or more ago there is likely to be an enormous amount of repair work in the shape of rebuilding and reconstruction of the many structures damaged by the recent flood, also the erection of new buildings to take the place of those totally destroyed by fire and water. Almost without exception those buildings of importance contemplated before the flood will be erected with but slight delay. Owners of destroyed property have taken the preliminary steps looking to the erection of larger and better buildings on the old sites. Several four and five-story reinforced concrete buildings and one ten-story concrete office building will grace the site of the East Third Street fire. Likewise most of the other structures will be immediately replaced by better buildings than those destroyed.

The repair work is progressing rapidly upon the heels of the cleaning-up process. Carpenters and house movers, painters, paperhangers and decorators are exceedingly busy and numbers of these classes of mechanics are daily arriving in the city and are being employed by local contractors. Other branches of the building business are delayed to some extent owing to delay in arrival of building materials. All things considered a busy summer seems to be in store for those engaged in all the various branches of the building trades.

Los Angeles, Cal.

April building permits set a new high record, both for number and valuation, the latter being \$5,047,065, compared with \$2,650,461 for April, 1912. The number of permits up to April 29 was 1701, compared with 1671 for the previous month. The great increase in value was due to the granting of permits for several unusually costly structures, though the valuation of homes and buildings of medium

size was also somewhat higher than usual. Among the larger buildings for which permits were issued were: the Merchants' Fireproof Building Company's 12-story, Class A, structure at Sixth and Spring streets, valued at \$860,000, the principal contractors being the Llewellyn Iron Works, steel; Raymond Stone Company, granite, and Weymouth Crowell, foundations; the Trinity Methodist Church, to cost \$500,000; the 14-story Home Builders' building, to cost \$500,000, and the 12-story Hotel Rosslyn, to cost about \$1,000,000, on which the principal contractors are: Llewellyn Iron Works, 2100 tons of steel; Gladding, McBean & Co., terra cotta, and F. O. Engstrum Company, general contract, at \$360,000.

Other large buildings for which contracts have been let are: the 7-story I. W. Hellman building, to Weymouth Crowell, at \$92,450, and the State Normal School, in this city, to J. F. Atkinson, at \$451,166, the contract covering general construction of ten buildings.

New York City

The striking feature of the local building situation during the month just closed was the very heavy shrinkage in the estimated cost of building construction for which permits were issued as compared with April, 1912. This shrinkage was marked in every borough of Greater New York except Queens, where an unusual amount of new work was projected; in fact, the month of April showed one of the largest records in the history of the borough, there having been 480 plans for new buildings filed, estimated to cost \$1,525,697.

In the Borough of Manhattan there were 86 new buildings planned in April involving an estimated outlay of \$6,455,170, while in the same month last year 101 new buildings were planned estimated to cost \$14,095,175. The estimated cost of alterations last month was \$1,015,188 and in April a year ago \$1,343,651.

The heavy shrinkage in new construction work in Manhattan was due to lessened activity in various classes of buildings, but more particularly in what is known as store and loft buildings. It will be recalled that a year ago there was great activity in the erection of buildings of this nature, and the supply provided has apparently been much greater than the demand, for last month there were only 12 permits issued for this class of structure involving an estimated outlay of \$1,223,000 as compared with 22 in April last year involving an estimated outlay of \$5,423,000. For office buildings there were no plans filed last month, while in April a year ago permits were issued for 6 estimated to cost \$3,120,000. Last month there were two manufactories planned costing \$110,000, while in April last year 4 such buildings were planned involving an estimated outlay of \$1,675,000.

Among the classes of buildings showing increases are apartment houses legally designated as "tenements," of which 29 were planned last month costing \$2,662,000, as against 25 costing \$2,238,000 in April a year ago, and 12 places of amusement costing \$1,266,500, as contrasted with 12 costing only \$441,300 in April a year ago.

For the four months of the current year permits were issued for 252 new buildings costing \$27,310,285, while in April a year ago 294 new buildings were planned costing \$42,425,375. The alterations for the two periods were \$3,348,627 and \$4,080,946 respectively.

In Brooklyn there were 427 new buildings planned last month costing \$3,399,646 as against 693 new buildings in April last year involving an estimated outlay of \$5,169,740. Adding \$361,815 and \$434,624 for alterations for the two periods respectively give totals of \$3,761,461 for last month and \$5,604,364 for April a year ago.

For the four months of the current year 1451 permits were issued by the Bureau of Building calling for an outlay of \$12,261,244, against 2326 plans for buildings costing \$16,444,243 last year.

For the first four months the Bureau of Building in the Borough of the Bronx issued 407 permits for buildings costing \$10,424,491. These figures compare with 515 buildings costing \$13,269,770 in the same period of 1912.

Permits issued in the Borough of Queens during the first four months of the year total 1822 calling for an estimated outlay of \$5,877,173, while in the corresponding months of last year there were 1755 permits issued for building improvements costing \$5,416,597.

In the Borough of Richmond the first four months of this year showed a total of 346 permits for building improvements estimated to cost \$558,007, which figures contrast with 335 buildings costing \$1,330,618 in the corresponding months of 1912.

Omaha, Neb.

During the month of April building permits were issued with a total valuation of \$575,085, this being an increase of about \$70,000 over the figures for the corresponding month last year.

Building operations for the first four months this year showed a total of \$1,238,373. For the same period last year, the total is \$1,112,765, an increase of 11 per cent. These figures do not include rebuilding and repairing on account of the recent tornado, as the Building Department did not require permits for work in the tornado district.

Philadelphia, Pa.

The absence of heavy individual building operations in April, such as large manufacturing plants, which aided in swelling the statistics for March, reduced materially, from the monetary standpoint, the volume of business reported by the Bureau of Building Inspection statistics in April. At the same time the usual lines, such as two-story dwellings, alterations, additions, etc., showed a slight increase over the previous month. The general conditions may, therefore, be considered as on a fairly even basis.

From statistics compiled by the Bureau of Building Inspection, permits are shown to have been issued for 1,692 operations at an estimated expenditure of \$3,689,615, as compared to \$6,206,500 in March and \$4,503,385 in April, 1912. Compared to two-story dwelling house operations in March, the past month's record shows a slight gain, the expenditure authorized being \$1,607,050 in the former month as compared to \$1,631,430 in April. The number of operations was, however, smaller, due to the increasing number of so-called two-family dwellings, the cost of which is materially higher than that of the usual type of two-story house designed for use by one family.

Dwelling-house operations of the two-story type have so far been on practically an even basis with last year. Expenditures in the first four months of 1912 being 4,000,705 as compared to \$3,965,005 so far this year. General building in the same period last year aggregated \$11,489,685, while this year's statistics show a total authorized expenditure of \$12,877,500. A further analysis of April statistics shows authorized construction of garages amounting to \$62,990, nearly double that of March. Warehouses lost \$680,000 in that no permits for that class of work were taken out. Places of amusement showed a sharp decline, while in school buildings a falling off of nearly \$500,000 compared to March is noted.

The outlook for continued activity in the building trades is good, considerable large work is on architects' boards and builders are estimating on many jobs.

The labor situation has been somewhat unsettled, but not serious. Here and there operation work has been delayed by strikes in one or the other branches of the trade. Adjustments satisfactory to both employers and employees have, in the majority of instances, been made.

The Weidener interest, owners of the Ritz-Carlton hotel, Broad and Walnut streets, have acquired adjoining properties at 1336 and 1338 Walnut street and 211 South Broad street, which will be used as sites for a 12-story addition to the hotel, plans for which are being prepared by Horace Trumbauer. The additions, when completed, will give the hotel a frontage of 100 feet on Walnut street and 142 feet on Broad street. The present hotel building occupies a site 40 x 120 feet.

Among various dwelling-house operations recently started may be mentioned one of 10 two-story houses 16 ft. 4 in. x 54 ft., at Wyoming avenue and Thirteenth street, by A. M. Zane. Park & Nield began work on 50 two-story houses and stores and dwellings at Front and Ritner streets, to cost approximately \$96,000. Work has been started at Womrath and Romain streets by Ferris C. Webb on 30 two-story dwellings.

E. Allen Wilson, architect, has completed plans and specifications for 38 two-story dwellings for the Model Building Company. They will be 24 x 36 ft. and contain stair hall, living and dining rooms, pantry and kitchen on the first floor and four chambers and bath on the second floor. The basement will contain laundry and billiard room. The design is modern English of brick, old timber and rough coat walls, hardwood floors, electric lights, hot water, heat, shower bath and other modern improvements. Bids are now being taken.

The Charles McCaul Company has the contracts for two schools to be built for the Board of Education. One will be located at Twenty-second and Ritner streets, the other at Fifth and Nedro avenues. Both buildings will be of brick and cement, four stories in height, the former 160 x 114 ft. and the latter 160 x 88 ft.

Pittsburgh, Pa.

An increase of over \$48,000 in the value of building permits issued for the month of April is to be noted as compared with the corresponding month of last year, although the number of permits issued falls below the April, 1912, figure, by 76, showing a greater average value for each improvement. Three hundred and ninety-five permits were

issued for operations to cost \$1,057,762. One hundred and thirty-three of these were for new buildings to cost \$811,646. Forty-six were for additions to cost \$56,792 and the other 216 were permits for alterations and repairs to cost \$189,324. Of the new buildings authorized, 86 are to be of brick, 23 frame, 21 veneered and 1 terra cotta, 1 stone and frame and 1 cement.

Portland, Ore.

The building record for April is the best since December, 1910, the total valuation of buildings for which permits were issued reaching \$2,938,770, compared with \$2,419,936 in April, 1912. A large part of this valuation represents buildings formerly mentioned, for which contracts were let several months ago, the owners having delayed getting out permits as long as possible. There is, however, some actual increase in activity, plans having been submitted for a large number of structures from 4 to 5 stories high, valued at \$60,000 to \$100,000, all but the largest being of concrete or mill construction.

The only really large buildings under way are the Northwestern Bank, 15 stories, replacing the Marquam building; the Bell Telephone building, 11 stories; the Theodore Wilcox building, 12 stories, and the Northwestern Electric building, 200 ft. square and 8 stories high.

Among the buildings on which contracts will soon be let are: the Hoffman school at E. 69th street and Powell Valley road, to cost \$70,000, F. A. Narramore, architect; and the 8-story Title & Trust Company building, to cost about \$100,000, McNaughton & Raymond, architects.

Plans are now under way for an 8-story reinforced concrete building for The Builders' Exchange. The original plan was to build on a lot 50 by 114 ft., at Fifth and Ankeny streets, but efforts are now being made to secure the adjoining 50-ft. lot, doubling the original size. The lower floor will be kept for The Builders' Exchange, the upper floors being fitted as offices for architects and contractors. The front will be faced with light colored brick. The cost, if the original plan is followed, will be about \$100,000, or \$250,000 if both lots are used.

Sacramento, Cal.

Comparatively little new work has been undertaken locally in the last month, the April building record being \$210,427, compared with \$569,177 for March, and \$210,685 for April, 1912. Tentative plans, however, are under way for several important buildings, both private and municipal, and some good-sized construction is under way at other towns of central California.

Among the larger buildings contemplated are: a 10-story building at Fourth and J streets for G. W. Peltier and others, to cost about \$350,000, C. S. Kaiser, architect; a \$75,000 theatre on K street, near Eleventh, plans by a San Francisco architect; and two concrete warehouses to cost about \$50,000 each, for the Capital-Sacramento Van & Storage Company. Revised plans have also been adopted for a city jail and hall of justice, to cost about \$208,000, Joseph Rowell, architect. Architects Shea & Lofquist will have charge of construction of the \$160,000 school at Twelfth and V streets, and Architect J. J. Donovan will supervise construction of a school at Oak Park.

Buildings soon to be built in nearby towns are: a \$150,000 theatre at Fresno, plans by Architect King of San Francisco; an 8-story building for the Commercial & Savings Bank of Stockton, Cal., to cost about \$250,000; and a \$75,000 hotel at Modesto, Cal., B. J. Joseph, San Francisco, architect. The \$100,000 3-story concrete building of the American Can Company at Vallejo, Cal., is about complete.

San Diego, Cal.

The valuation of buildings for which permits were issued in April was \$776,850, as against \$1,062,631 for April, 1912. The apparent decrease causes no disappointment, however, as most contracting firms are still quite busy with work on previous jobs, and there is enough work on the boards to assure an active summer.

The largest building for which a contract has recently been let was the Southern California building of the Exposition, to the John Simpson Company, at \$62,250. W. W. Massey, Knoxville, Tenn., was the successful bidder on roofing for ten of the Exposition buildings, about 300,000 square feet of material being required.

Among the principal buildings on which contracts will be let soon are the following: a 7-story concrete hotel on D street, to cost about \$125,000, W. S. Keller, architect; a 4-story brick hotel covering a quarter-block at Fifth and A streets, estimated cost \$100,000, H. L. Gay, architect; a \$100,000 freight house for the Santa Fé Railroad, R. H. Wells, engineer; a group of 16 amusement buildings at Ocean Park, to cost about \$100,000, R. H. Orr, architect; the 6-story Spreckels building, Harrison Allbright, archi-

tect; and a 6-story annex to the San Diego "Union" building.

Architect W. S. Hebbard has plans for two 2-story, 12-room residences, to be built on Point Loma, at a cost of \$30,000 each, for Mrs. H. L. Sefton and J. W. Sefton.

San Francisco, Cal.

The record of building permits for April is the best in over three years, being \$3,152,020, compared with \$1,599,967 for the previous month, and \$1,916,659 for April, 1912. Of this valuation a rather large proportion is for permanent construction, including quite a number of Class A jobs. Of these some of the largest were: the 14-story Clift estate hotel at Geary and Taylor streets, valued at \$550,000; the 14-story Crocker hotel at Post and Powell streets, valued at \$600,000; and the 7-story addition to the Stewart hotel, to cost \$100,000.

Exposition and municipal work are naturally the matters of greatest interest, as most of the contracts will probably be let before the end of summer. Neil A. McLean has the general contract for the Food Products building at \$222,756, and contracts for piling, plumbing and some other divisions of the work have been let on the Manufactures, Fine Arts and Agriculture buildings. There are now over 400 men employed on the Machinery building, including over 200 carpenters. About 280,000 ft. of lumber a week is being used in this building, and 400 tons of steel bolts, bars and light shapes have been used so far. The largest column in this building will weigh 28 tons, and the heaviest truss 10 tons.

A building now being planned which will stand among the largest private projects of the year is another addition to the Mills building, covering a lot 66 by 137 ft., 10 stories high, and costing about \$500,000. Willis Polk is the architect. Among other important projects to be figured in the near future are: a 7-story steel and concrete hotel on Taylor street, to cost \$70,000, M. Mattanovich, architect; and a 3-story Class A addition to the Emporium department store, fronting Mission street, near Fifth, to cost \$200,000, Albert Pissis, architect.

A \$32,500 contract for excavation and foundations has just been let for the residence of C. T. Crocker at Hillsborough, Cal., the estimated cost of the complete building being nearly \$1,000,000.

While some lines of building material are in a little easier supply, the general situation remains very firm. Structural steel is still hard to get in less than 90 days, and while the demand for reinforcing material is hardly as heavy as last month new inquiries are expected shortly and prices are firmly held. Lumber from the northern mills is arriving in very large quantities, though prices are very well maintained and the local demand is increasing. Common brick is moving off in better shape than for about a year past, and several million will be required for a few individual jobs in San Francisco and vicinity. Cement, lime, sand and rock are in strong demand at steady prices.

Seattle, Wash.

Figures for April show that, although the number of building permits issued exceeded those for the corresponding month of last year by about 2 per cent, there was a decrease of nearly 32 per cent in the valuation of the improvements, thus showing a lower average cost than was the case a year ago. There were 948 permits issued with a total valuation of \$840,595. The reverse, however, is the case with regard to frame buildings, for although the number of permits issued for this class of structure was more than 6 per cent less than that of April, 1912, the total valuation exceeds that month by 73 per cent. The same condition holds true with regard to detached residences. The total number for April falls below that of the same month last year by 8 per cent, but the total value exceeds that of last year by 32 per cent.

Three thousand one hundred and fifty-nine permits were issued up to the close of April this year with a total valuation of \$3,638,780, an increase of 9 per cent over the same period of last year.

Springfield, Ohio

The officials of the Builders' Exchange of Springfield have inaugurated a movement which is expected to result in great benefit to the members. The rooms have been re-decorated, the woodwork re-painted and a cork floor has been laid. A series of desks have been placed along the south and north walls for the convenience of contractors who wish to transact business, these desk spaces being separated by iron railings suitably painted. At one end of the main room is a large table where blueprints and specifications of new work are spread out and upon which bids are invited. A large blackboard carries announcements and dates when bids are required on the different work.

Under the re-arrangement there is an ante-room connected with the private office of Secretary Donald Kirkpatrick. In the office of the latter is the latest informa-

tion about new work not only for Springfield but for all important cities and towns in that section of Ohio.

Tacoma, Wash.

The building report for the month of April shows an increase of 29 per cent in the valuation of building improvements as compared with that of the corresponding month last year. A coincidence is found in the fact that the same number of permits was issued in April for both years, the total valuation for April, 1913, being \$160,759.

Toledo, Ohio

Three hundred and four building permits were issued during the month of April with an approximate valuation of \$885,315, which is an increase of nearly 59 per cent over the corresponding month of last year.

In the first four months of this year, 679 building permits were issued, approximating a valuation of \$2,048,756, compared with 506 permits of an approximate value of \$1,427,013 in the first four months of last year.

Law in the Building Trades

BY A. L. H. STREET

Nature of Roofing Contract

A contract to furnish roofing laid in asphalt pitch on a concrete surface and to furnish and set roofing tile, is not a contract for construction work, but a contract for materials, and, hence, is not governed by the California law, which requires building contracts involving more than \$1,000 to be recorded. (California District Court of Appeals, California Portland Cement Company vs. Wentworth Hotel Company, 118 Pacific Reporter 103.)

Architect Not Entitled to Mechanic's Lien

An architect is not entitled to a lien against a building, not being a laborer, mechanic or materialman. (North Carolina Supreme Court, Stephens vs. Hicks, 72 South-eastern Reporter 313.)

Right of Subcontractor to Lien

Provision in a building contract that no lien shall be filed against the building binds a subcontractor as well as the contractor. (Pennsylvania Supreme Court, Felin vs. Locust Realty Company, 81 Atlantic Reporter 158.)

Validity of Recorded Building Contract

Under the California statute, which requires a building contract involving more than \$1,000 to be recorded, a contract is unenforceable, where it is privately agreed that the work shall be done for \$33,000, but the recorded agreement fixes the amount at \$35,000. (California Supreme Court, Condon vs. Donohue, 118 Pacific Reporter 113.)

Liability for Injury Caused by Rope Untying

An employe injured through untying of a rope by which he was suspended on a roof, cannot recover from his employer, though a foreman tied the knot, where the injured employe had ample opportunity to examine the knot. (Pennsylvania Supreme Court, McGrath vs. Thompson, 80 Atlantic Reporter 1109.)

Conclusiveness of Architect's Decision

An architect's decision that rejected material does not comply with the specifications is conclusive, where he acts in good faith, though somewhat ignorantly or mistakenly. (Massachusetts Supreme Judicial Court, Evans vs. Middlesex County, 95 Northeastern Reporter 897.)

Time for Payments Under Building Contract

Under a building contract providing for payments "weekly as the work progresses, and in full when done," the contractor is entitled to weekly payments covering his outlay for labor and materials, not exceeding the amount of the contract price, and to any balance remaining due when the work is completed. (Connecticut Supreme Court of Errors, Kelly vs. Alling, 80 Atlantic Reporter 782.)

No Right to Lien Against Public Building

A subcontractor or materialman is not entitled to a lien upon a public building for labor or material furnished therefor. (Michigan Supreme Court, Ford vs. State Board of Education, 132 Northwestern Reporter 467.)

BUILDERS' APPLIANCES AND EQUIPMENT

Some Things of Seasonable Interest to Those Having
to Do with the Building Business

The "Craftsman" Steel Beam Ceiling

A steel ceiling with all of the satisfying appearance of the true golden oak beam paneling, at a less cost, and with the added consideration that it is not inflammable offers the residence architect or builder an opportunity to fireproof the interior of a dwelling as easily as the outside. Until a few years ago the imitations of wood which were produced needed the added factor of a vivid imagination to carry the illusion, but methods have been so improved that it is now possible to produce a facsimile of any kind of wood, with the proper finish and so like the original that the closest inspection will sometimes not disclose the identity of the imitation. The problem has been solved and the quality of the workmanship is now merely a question of cost.

In the "Craftsman" Beam Ceiling, the Northrup, Coburn

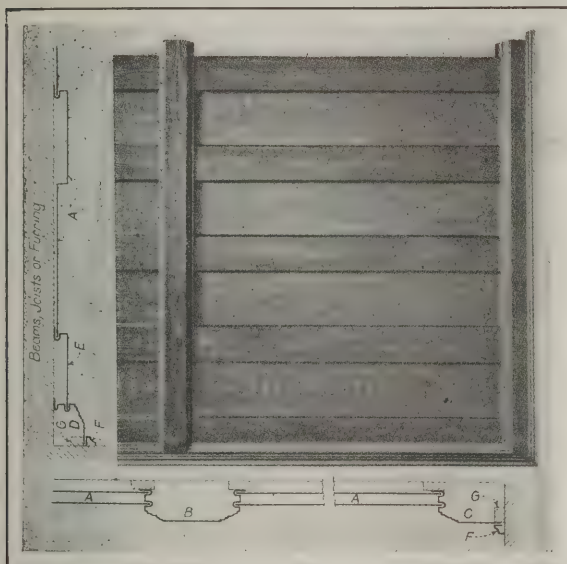


Fig. 1—Details of the Beam Ceiling

The Craftsman Steel Beam Ceiling

& Dodge Co., 43 Cherry St., New York City, claims to have produced so accurate an imitation of the oak timber and paneling that the product is not distinguishable from the genuine at the usual distance from which a ceiling is viewed. The statement is made that this ceiling can be installed at a figure which will prove attractive to the purchaser. The interior shown in Fig. 2 represents the library of a residence in Jersey City, N. J., in which the "Craftsman" Beam Ceiling was used. The latter was grained at the factory and put up to a plaster ceiling without the use of furring strips, as all of the parts are nailed through flanges which are subsequently covered by adjoining sections. Both the sides and end edges of the sheets fit into grooves of the adjoining pieces, and the ends of the small beams fit into grooves in the large beams. The nails are concealed in the flanges of the sections.

Fig. 1 shows a detail of the ceiling shown in Fig. 2, and, as these ceilings are made to order, it will be noted that they are adapted to the style and proportions of the room. The cornice is a half beam with a molding beneath it. The graining of the oak is well shown in the illustration.

In the Mission Style beam ceiling which is also carried in stock by this company the beams are plain, 2 to 6 in. in depth and 4 to 8 in. wide. When this style of ceiling is used the imitation wood panels are sometimes replaced by twilled iron or small stamped patterns. The latter are made without visible joints and the stock patterns are such as will effectually avoid the small squares and straight lines

which suggest the character of the material employed.

One point in connection with the painting and decorating of metal ceilings is of wide application. In the case of a raised pattern, if a light coat of paint is applied and allowed to dry, and then a second darker coat is applied, and, before the latter is thoroughly dry, a cloth be applied to the raised portions, a sufficient amount of the darker paint may be wiped off to allow the light under coat to show through. This produces a decorative effect which is out of proportion to the small amount of labor involved, and, where a light ochre first coat has been used, the effect is that of bronze.

A baked white enamel imitation tiling is furnished which is adapted to kitchens and bathrooms. Plain tiling sheets are also carried, to be enameled after installation. The tiling is applied over a sheathing of narrow dry boards, and secured to the backing with small nails.

Fireproof construction can be secured by the use of



Fig. 2—Interior View of a Room Having a "Craftsman" Ceiling

metal covered furring strips as a backing for the steel ceiling.

Sanitas Wall Covering

A wall covering which it is claimed will not fade, is easily applied, can be washed with water, and is supplied in a sufficient number of styles to meet all requirements makes an article which should be of interest to the trade. A 20-page booklet issued by the Standard Oil Cloth Company, 320 Broadway, New York City, contains this claim for Sanitas Wall Covering and describes the product with numerous well-executed colored illustrations which show the uses to which it can be applied. Sanitas has a woven cloth foundation upon which oil colors are applied. It will take stencil decoration and in addition to the numerous stock styles of plain treatment are a number of designs applied on an embossed surface, which is given the trade name of Egg-Shell Gloss Finish. The latter resembles embossed wall paper and a color card is furnished showing the various shades which are regularly carried in stock. Although this product is especially desirable for use in kitchens and bathrooms, it seems to be equally suitable for other portions of a dwelling, and the claim is made that the durability of the product makes it compare in ultimate cost very favorably with that of other materials. Special attention is called to the desirable features of Sanitas as a wall covering for use in hospitals, physicians' offices and

other places where absolute cleanliness is a requisite. Accompanying the catalogue is a booklet devoted to the subject of stenciling.

Building a Concrete Vault with "Blaw" Wall Forms

In the half-tone engraving presented herewith we show a frame office building which is being remodeled by the construction of a fireproof concrete vault for the storage of blue prints and office records. It is approximately 27 ft. long, 14 ft. wide and 22 ft. high above the ground level. Its foundations extend 6 ft. below the surface. The roof of the vault is of concrete although covered also by the roof of the building.

The vault is divided into two stories with entrances to it at each level. The upper story is used for blue print filing, while the lower story is designed for the filing of records.

In the construction of this vault Blaw Steel Forms were

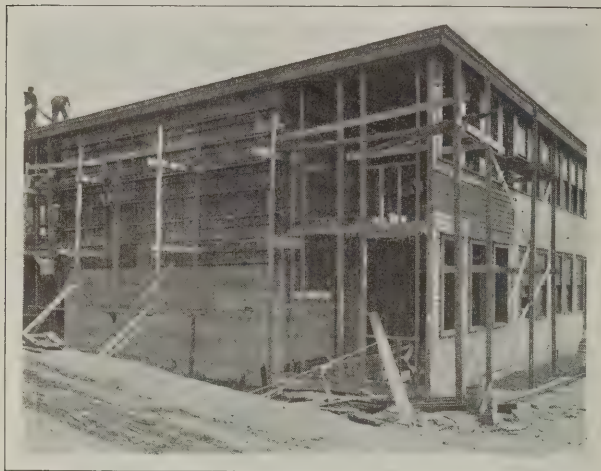


Fig. 3—Building a Concrete Vault with "Blaw" Wall Forms

used and the panels still in place on the upper portion are clearly visible on the exposed face of the wall, although the panels had been removed at the ends of the wall at the time the picture represented by Fig. 3 was taken. The spacers had not all been removed at this time and the projecting ends of some of them are visible in the lower part of the picture. The rectangular panels and the liners are also clearly visible in the photograph.

These forms were used on both the inside and the outside of the wall and the cost of handling the "forms" on this work is said to have been in the neighborhood of one cent per square foot of wall surface.

The scaffold shown in the picture was erected for the purpose of supporting the men while placing the "forms" in position and as will be observed was not required to keep the "forms" in proper alignment.

The frame office building here shown is located at Hoboken, Pa., and the steel wall forms used in connection with the vault construction are those of the Blaw Steel Construction Company, Penn Avenue and Anderson Street, Pittsburgh, Pa.

The O. K. Adjustable Plumb or Level Fixture

What is referred to as one of the handiest and most economical devices ever made for carpenters, bricklayers and cement workers is the O. K. Adjustable Plumb or Level fixture shown in general view in Fig. 4 and made by

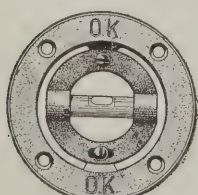


Fig. 4—The O. K. Adjustable Plumb or Level Fixture

S. L. Strattan & Co., Box 776, Columbus, Ohio. This device is easily and quickly put on any plumb staff for plumbing, studding, door jambs, etc., or on a straight edge for leveling joists and foundations. It is made of hard aluminum and is therefore light and indestructible. It has a screw adjustment and can be used repeatedly on plumb staffs or straight edges and is so simple that there is no time lost when it needs adjustment, which, it is

pointed out, is not often, owing to the fact that it has a locking device in the adjusting screw, which, once it is tightened, never becomes loose. The fixture is referred to as being of great value to the mechanic who has considerable plumbing or leveling to do and "time saved by the employee is money in the employer's pocket."

Concrete Pavements, Sidewalks, Curb and Gutter

The Information Bureau of the Universal Portland Cement Company, 72 West Adams Street, Chicago, Ill., has just issued a very interesting work on the subject indicated by the above title. As these various kinds of work are often laid in close proximity there is a decided similarity in materials and methods of construction and much repetition can often be saved by combining the points common to all as has been done in the first part of this booklet and which deals later more specifically with each type. The work is profusely illustrated with line and half tone engravings, each picture being of a nature to tell its own story.

It is often the case that illustrations are of more educational value than many pages of text and failures are frequently more beneficial when carefully studied than examples of perfect work, consequently not only successes but typical failures are discussed in the hope that defective work may eventually disappear.

Not the least interesting feature of this booklet are the proposed revised standard specifications for concrete curb and concrete curb and gutter presented to the National Association of Cement Users in December last.

Bishopric Stucco or Plaster Board

Supplementing the reference in our last issue to the new product known as "stucco or plaster board," which has just been placed upon the market by the Mastic Wall Board & Roofing Company, 376 Este Avenue, Cincinnati, Ohio, we present herewith illustrations showing the appearance of the board and also a cross section after it has been nailed to the studding and the stucco or plaster applied to it. There is no metal used in connection with the board, therefore it cannot rust. It is made of patented keyed lath embedded in toughened Asphalt-Mastic, the lath tending to keep the surface stiff while the "keys" grip the stucco or plaster as shown. Asphalt-Mastic is referred to as being moisture-proof and fire-resisting and at the same time temperature-proof. The company states that among its advantages is a saving of fully 50 per cent in material and 25 per cent in labor. The walls and ceilings constructed of Bishopric Stucco or Plaster Board are light and much more substantial than ordinary lath and plaster walls. In Fig. 5 of the illustrations is presented a vertical cross section of a wall or partition showing the stucco or plaster board nailed to the studding and with the stucco or plaster applied. It will be seen that the "keys" are under-cut so as to give a dovetail effect and when the plaster is put on it is firmly keyed to the wall, while the Asphalt-Mastic serves as in-

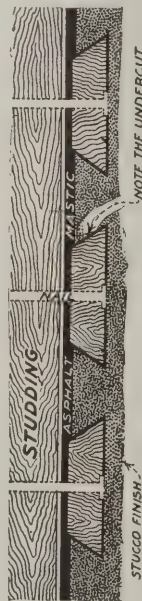


Fig. 5—Vertical section through wall or partition

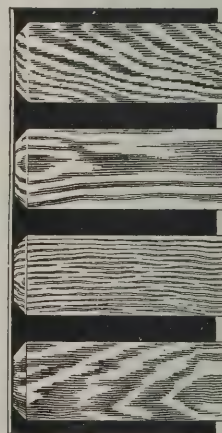


Fig. 6—Appearance of a section of the stucco board

The Bishopric Stucco or Plaster Board

ulating backing. In Fig. 6 is shown a plan view of a section of the plaster board affording the reader a good idea of the appearance of the board before the plaster is applied to it.

Bishopric Stucco or Plaster Board is furnished in sheets 4 ft. square ready for use and claim is made that one man can put on the board faster than cement plasterers can follow. The only tools required in applying the board is a hand saw, hammer and nails. There is no waste of material or time and in its application the builder is not compelled to pay for window and door openings. The board is

(Continued on page 42)

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shipped in crates of 16 sheets, each crate weighing 300 lb. The claim is made that by the use of this board plaster and cement walls are rendered permanent; that it prevents cracking, and that it gives a better job at a greatly reduced figure. The company sells the Bishopric Stucco or Plaster Board under its absolute guarantee of refunding the money if the material is not as represented.

Hoffman Instantaneous Gas Water Heater

An adequate supply of hot water is one of the essential features of the modern home and architects, builders and homeowners generally who desire to install the most up-to-date equipment cannot fail to be interested in the new line of instantaneous automatic gas water heaters which has just been brought out by the Hoffman Heater Company, Lorain, Ohio. The point is made that with a Hoffman heater properly installed in the house a bountiful supply of hot water can be obtained any time in the day or night simply by turning the faucet. The supply is instantly available at any fixture in the house, whether it be in the laundry in the basement or the bathroom on the upper floor, and not only does it provide the hot water necessary for the bathroom but a supply can always be had in the kitchen for cleaning and cooking, thus doing away with the unsightly range boiler which is often the frequent cause of delay by reason of the necessity of waiting for the water to become heated. In the laundry it saves delays, prevents the house from being filled with steam and odors and furnishes as much hot water as may be needed. In fact the water heater has been designed to supply an almost universal demand for an economical method of producing hot water instantly that would mean comfort, cleanliness and sanitation in the home. In Fig. 7 we show an interior view of the Hoffman Instantaneous Gas Water Heater, a portion of the outer casing having been broken away so that the burners and coils are clearly visible. The Hoffman line ranges all the way from the smallest tank heater to the largest automatic heater. The Instantaneous Automatic Heater is made in three sizes with capacities ranging from 3 to 6 gallons per minute. These are equipped with thermostatic valves which automatically regulate the flow of gas to the burners, thus keeping the water at the desired temperature at all times.

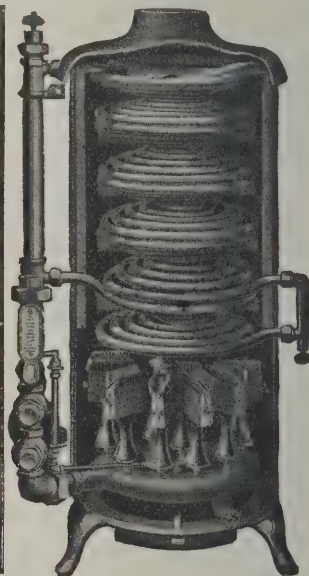


Fig. 7—View of Hoffman Instantaneous Water Heater

The Hoffman Instantaneous Automatic Heaters are sold under a guarantee against any defects in workmanship or material for one year. The company also calls attention to the fact that every Hoffman is sold on 60 days' trial and that if it does not fulfill the claims made for it after being properly installed according to instructions, the purchaser may return the heater to the company and the price paid will be refunded. The company also makes what is known as the Hoffman Bungalow Water Heater which is intended for use in bungalows, small houses and flats. These are offered in three sizes, having a capacity ranging from 2 to 3 gallons per minute.

The company has issued a very attractive little pamphlet relating to its various lines of heaters and a copy of it will be sent to any reader who may make application for it.

Perfection Tool Grinder

A new tool grinder which has just been added to the extensive assortment turned out by the El Starr Mfg. Company, Milwaukee, Wis., is the "No. 30 Perfection," illustrated in Fig. 8 of the accompanying cuts. This machine is referred to as being entirely noiseless and fitted with ball bearings running in a bath of oil. It is said to mark the first great improvement in this class of grinders. The bearings are extra long and the wheel for grinding sickles extends over the bearings. Both the sickle and the tool wheels are extra large, the former being 4½ in. in diameter and the latter 5 in. in diameter. The statement is made that when the sickle wheel is being used the tool wheel must necessarily be removed, but when the sickle wheel is not

(Continued on page 44)



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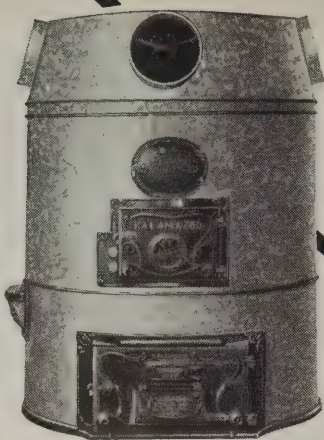
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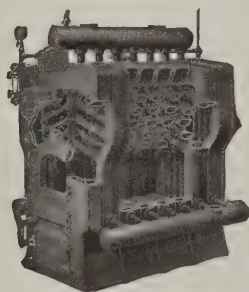
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in use the tool wheel can be utilized without the necessity of removing the other. When the season is over for sickle grinding the wheel can be replaced with a fine or medium grit tool grinding wheel so that one wheel can be

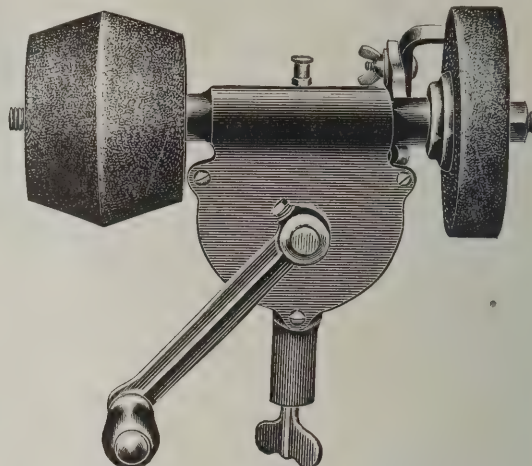


Fig. 8—General View of "Perfection" Tool Grinder

coarse and the other fine, thus giving a tool grinder for all purposes. The company states that it considers this machine as far ahead of the ordinary mower knife grinder as the enclosed cut gear is ahead of the old chain machines. The device is strong and compact and with all attachments weighs about 15 lb. In addition to the machine here illustrated the company is making one almost identical with it except that it is for use in the household and by mechanics and can be fitted either with one fine and one coarse wheel or with one wheel, the face of which will be fine and the other part coarse, all arranged so that the machine can be used either in a vertical or upright position.

Motor-Driven Double-Acting Builders' Hoist

The builder and mason contractor cannot afford to operate an extensive steam driven equipment to hoist his lumber, brick, and mortar, and the C. H. & E. Motor-Driven Double-Acting Builders' Hoist is designed to meet the requirements at a moderate cost. In Fig. 9 of the accompanying cut we show this device operating a hod hoist.

The C. H. & E. Mfg. Co., 330 Mineral St., Milwaukee, Wis., claims for the equipment that the gears are of heavy construction and of exceptional strength, running with very little noise and well-protected with casings which eliminate all danger in operation. All parts of the hoist and engine

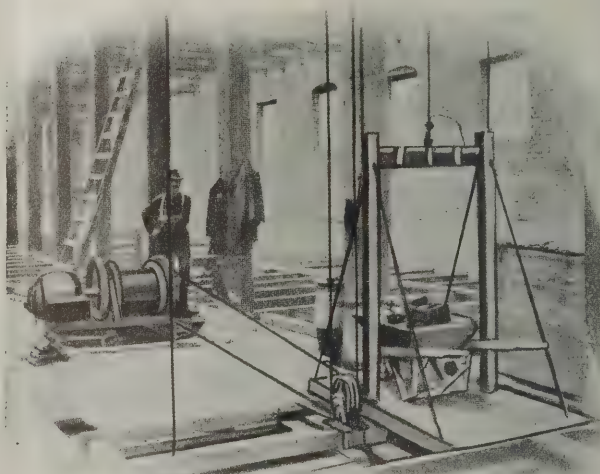


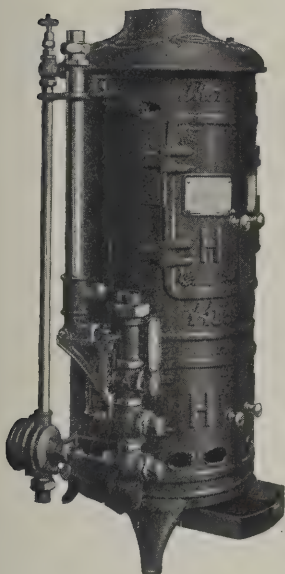
Fig. 9—Showing Motor Driven Builders' Hoist in Use

are interchangeable and duplicates can be obtained at any time on application to the Company. The Engineers of the Company will supply any desired information, together with a blue print giving construction details of any machine manufactured by the Company to anyone who mentions *The Building Age* in his letter of application.

The removal of water from trenches in construction work sometimes becomes a very serious matter to the engineer or contractor and where a greater lift of water is required than can be produced by the ordinary bilge pump, the problem of securing a pump of sufficient capacity

(Continued on page 46)

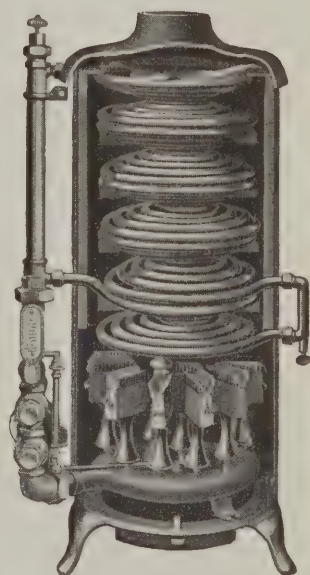
When Our Ancestor, The Cave-Man, Took a Bath



long years ago, he didn't have hot water like we moderns have, you know. The "Hoffman Heater" method then was far beyond his means: he had to heat his water up with red hot rocks, it seems. Remember, the

HOFFMAN HEATER

is sold on 60 days' trial and under a year's guarantee against any defects. We know that every Hoffman will make good,—that it will provide fresh and clean "instant" hot water at all times; and that is why we are so liberal with our offer. Let us tell you all about it—a two-cent stamp will bring full information regarding a money-making plan, for you.

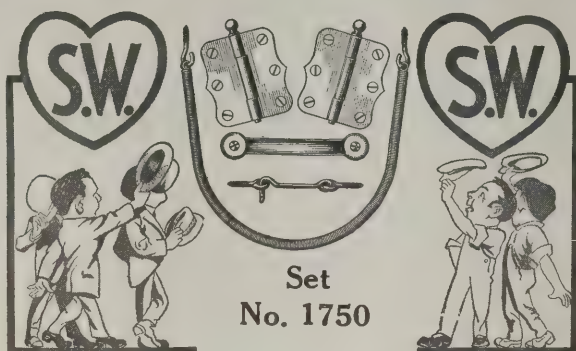


Hoffman Heater Co.

Lorain, Ohio

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Wrought Steel Screen Door Hardware



Each Set Complete with Screws Ready to go on the Screen Door

Owners and Builders alike are pleased with the high quality of the hardware and the convenient way it is packed ready for use.

Butts, pull, spring, hook and eye, and screws, all of the highest quality of material and workmanship.

They can be furnished in Japan, Antique Copper, Brass, or the "Stanley" Sherardized rust-proof finish, the proper finish for outside doors.

Write us for Circular "E"—it tells the story.

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And that's not all. You'll have a better and more lasting job because BRIDGEPORT STANDARD PREPARED PAINT is scientifically prepared from the "formula to the can."

Hand mixed is another name for imperfect paint; imperfect because the keg and paddle cannot do the work of modern machinery.

BRIDGEPORT STANDARD PREPARED PAINT is built, not made. Every process—every ingredient has a relation to the perfect whole; adds to its goodness, covering properties and durability.

The first "dip" of the brush makes apparent its goodness; a few strokes shows up its great covering capacity—and time has already proven its exceptional durability.

That's the kind of paint you need on every job. We are supplying it to many of the large industrial corporations.

"Modern Painting For Beauty and Protection" is full of interesting paint information. You're not fully posted on the paint subject until you get this book. We will send it free on request with complete color card.

Sole Manufacturers

The Bridgeport Wood Finishing Co.,
NEW YORK CHICAGO

New Milford,
Conn. BOSTON

which is not too heavy to be easily transported from place to place is not easy of solution. The C. H. & E. power-driven centrifugal pump described and illustrated in the catalogue is said to meet these conditions. For the use of contractors these pumps are furnished mounted on one end of a truck of the ordinary warehouse type and belt-connected to a 3 h.p. 4-cycle water hopper cooled engine ready to operate when delivered.

The portable saw jig is represented by several styles, one of which carries a circular saw and a jig saw on the same table, while another carries a circular saw and a grinder.

A New Gravity Window Lock

A gravity window lock which is referred to as simple yet durable in construction and which is automatically self-locking is being introduced to the attention of architects.

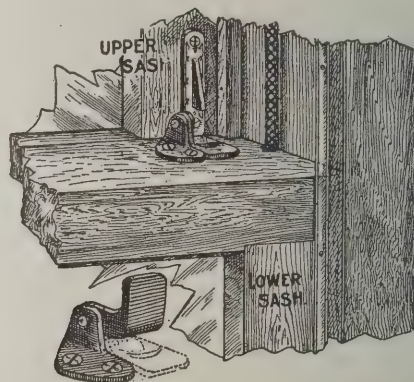


Fig. 10—Showing Application of Gravity Window Lock

builders, contractors and house owners generally by the Merit-Al Devices Sellers Company, Suite 527 Prospect Hippodrome Building, Cleveland, Ohio. In connection with this self-locking and burglar-proof sash gravity lock there are no thumb screws, springs or other delicate parts to break, rust or get out of order. It is made of malleable iron neatly finished in oxidized, brushed brass and polished brass. It locks the window when open for ventilation and is of such a nature that the top or bottom or both windows are always locked. Severe tests which have been made have proven that windows equipped with gravity locks cannot be forced with a jimmy or picked from the outside. In Fig. 10 we show a view of the gravity lock and also clearly indicate the manner in which it is used in connection with a window.

The Sash-Lift Ventilator

A sash lift which can be folded in flush with the window sash, but which, when open, admits air through a screened opening in the sash, is described in a pamphlet issued by the Pullman A. V. M. Co., York, Pa., which calls attention to the fact that, with this device, a constant supply of air can be admitted to any room while the windows remain closed and locked. The device consists of a metal plate provided with a movable section, and a flat metal plate perforated with small holes. The first has an opening about $1\frac{1}{2} \times 4$ in., into which closes a rectangular section which is hinged at the bottom and can be pulled out to give an opening of about 1 in. at the top. The top of this sec-

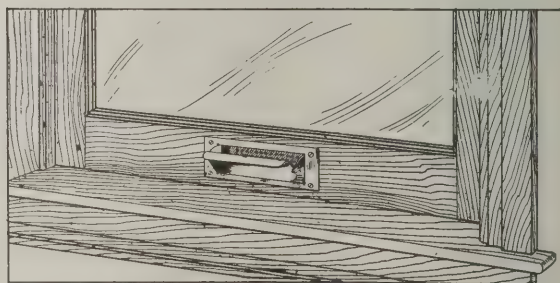


Fig. 11—The Sash-Lift Ventilator

tion is flanged out into a lip which serves the double purpose of a handle for manipulating the section and a finger grip for the raising of the window. The flat metal plate is perforated with small holes placed close together, forming a screen. In installing the device, a rectangular hole about 1×4 in. is cut in the middle of the lower sash member. The plate is screwed in position over the hole on the

(Continued on page 48)



UNIVERSAL PORTLAND CEMENT

Our New Book The Concrete House and Its Construction

is an invaluable aid to the designer, the contractor or the prospective owner of a concrete home. Nothing is more fitting, more fire resisting, more durable or more sanitary than concrete for the construction of residences from simple cottages to costly mansions. Get this book and learn about the possibilities of concrete for house building. Handsomely bound in cloth—224 pages—159 illustrations.

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| (2) Architectural Design and Treatment of Concrete Houses. | (7) Tables for Designing Reinforced Concrete Construction and Their Use. |
| (3) Details of Construction. | (8) Concrete Block Houses. |
| (4) Operations in the Field. | |
| (5) Calculations for Determining the Strength and Design of Reinforced Concrete in House Construction. | |

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Go into the most magnificent and beautiful homes and notice the wall finishes—solid colors, soft tints, dull flat shades. Then notice how effectively the hangings—pictures, draperies, ornaments—stand out against such backgrounds.

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is the favorite wall finish because it produces the most effective, artistic background known. More than this, the surface is hard and durable—can be washed like tile and is always *fresh and clean*. Then it's *absolutely sanitary*, it can't harbor disease germs like wall paper and does not crack, flake or peel like kalsomines.

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The R. F. Johnston Paint Co.
Pearl and Main Sts., Cincinnati, Ohio.

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because it is a profit which the other fellow always got until Plastergon superseded lath and plaster.

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and the builder can shade the plasterers' price enough to bring the job into his contract.

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Every Panel Is Guaranteed

to give absolutely satisfactory service.

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Department A TONAWANDA, N. Y.



Warm in Winter and Cool in Summer

inside with the lip on the upper side, and the screen is screwed over the whole on the outside of the sash. A view of the inside of the sash with ventilator in place is shown in Fig. 11. All parts are of antique finish, are of simple and durable construction, and present an attractive appearance.

The New York Metal Shingle

One of the latest designs of metal shingle which Miller & Doing, 39-41-43 York Street, Brooklyn, N. Y., have added to their assortment of specialties is known as the "New York," a general appearance of which is afforded by means of Fig. 12. The shingles are 10 x 14 in. in size and are packed 136 in a box—a quantity sufficient to cover 100 sq. ft. They are manufactured in I. C. Tin, painted and unpainted, galvanized iron, sheet zinc, sheet copper and sheet aluminum. The makers lay special stress upon the lock of the shingles and refer to the construction of the shingles as being fireproof, thus reducing the cost of insurance of the building on which they may be used; that they are lighter than wood or slate; will not split, warp or rot; can be applied by any one in less than half the time required to put on wood or slate, and that when in position they are artistic and ornamental. The company strongly advises purchasers of metal shingles to order them unpainted for the reason



Fig. 12—Showing Appearance of the "New York" Metal Shingle

that many metal shingles now on the market are made of what is known as "waster" sheets and the paint merely covers up the defects of the material. For the benefit of the uninitiated it is pointed out that "waster" sheets are those which are sorted out at the mill as having some imperfection; that is, they may have one or more holes in them or there may be spots that were not coated with the preservative material. A roof having even one such shingle on it is not a perfect roof and it will tend to give no end of trouble and expense. Where a painted roof is desired the painting should be done immediately after laying as the coat put on at the factory is invariably scratched and damaged in transportation or in process of laying. The "New York" metal shingle is said to embody many desirable features which the trade will appreciate, and every precaution has been taken to produce an absolutely satisfactory shingle.

Hollow Concrete Wall System Used in Farm Buildings

The value of the Van Guilder Hollow Concrete Wall System for use in the construction of farm buildings is being demonstrated at the Berkshire Industrial Farm, Canaan, N. Y., according to a recent communication from the Van Guilder Hollow Wall Co., 712 Chamber of Commerce Building, Rochester, N. Y. The boy students of the institution have operated the machines under competent supervision and several buildings have been erected.

Twenty farm buildings will soon be erected at the Farm

(Continued on page 50)



When the man about to build

consults you regarding the kind of roofing to be used, you take no chances when you recommend

(Quality Certified)

Certain-teed Roofing

(Durability Guaranteed)

Rolls and Shingles

Guaranteed 15 years—lasts longer

Certain-teed Roofing has won out on its own merit—it has made good on the roof.

Certain-teed Roofing for all kinds of buildings

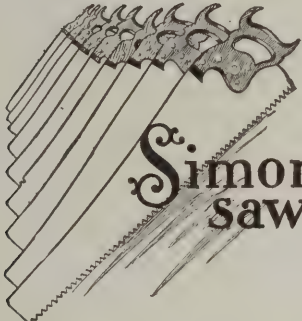
There is a simple method of applying **Certain-teed** Roofing on any kind of a building.

For residences, garages, barns, factories, use **Certain-teed** Roll Roofing—**Certain-teed** Shingles, for bungalows, residences, summer cottages, etc.,—**Certain-teed** Specification Roofing for skyscrapers, apartment buildings and all large flat surfaces.

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All Kinds All Styles All Sizes

All prices. And they're all easy cutting.

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You can make the teeth sharp as a needle and they will stay that way for a long time. Blades ground thinner on the back than at the tooth edge. You saw faster and easier.

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HARDWARE, TOOLS & SUPPLIES
4th Ave. & 13th St. NEW YORK, SINCE 1848.

for Truant and Delinquent Boys at Hinckley, Maine, using the same system. The students will operate the machines under the direction of E. M. Santee, Director of Agriculture of that institution. The statement made that this system has recently been approved by the Board of Superintendents of the Departments of Building, New York City.

The "Hudson" Asphalt Shingles

The proverbial "long felt want" is said to be supplied by the "Hudson" asphalt shingles and as the base of this product is long fibre felt, there is obviously a basis for the statement. This felt is saturated with asphalt compound which is said to render the product water proof and very strong. To this surface is applied a coating of



Fig. 13—The "Hudson" Asphalt Shingles as they appear upon a roof

crushed slate or feldspar. When dry the material is cut into sections 8 x 12 $\frac{3}{4}$ in. The shingles are green, red, or gray, according to the color of the slate or feldspar which is used, and attention is called to the fact that the use of this naturally colored material insures the permanency of the color. These shingles are laid over ordinary roof sheathing in the manner of wooden shingles and are usually placed 4 in. to the weather. A narrow strip is attached to the eaves to support the ends of the first shingle and a double row is laid at the bottom. The shingles are cut in half to fit the end of the roof on every other layer to stagger the joints. As the shingles are flexible they may be bent to conform to any desired surface. It is stated that 424 shingles will cover 100 sq. ft. of surface. The possible choice of three standard colors makes these shingles suitable for use as a siding material. The maker of these shingles, The Asphalt Ready Roofing Co., 9 Church street, New York City, states that "Hudson" asphalt is a fire-resisting material, and the April, 1913, issue of the *Quarterly* of the National Fire Protection Association has this to say concerning this point:

"Flexible asphalt shingles are now made of wool felt saturated with asphalt and surfaced with crushed slate or granite. Such shingles appear to possess strong fire-resisting qualities." A section of a roof showing the appearance of the shingles when laid is presented in Fig. 13 of the cuts.

The Stanley "Forty-Five" Plane

The Stanley Rule & Level Company, New Britain, Conn., has just issued from the press an attractive booklet relating to its Stanley "Forty-five" plane which in reality com-

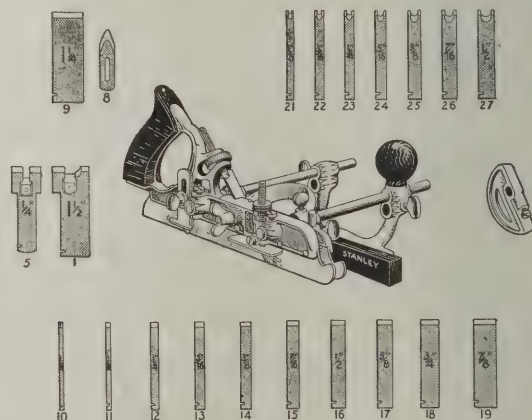


Fig. 14—The Stanley "Forty-Five" Plane with Its Various Cutters

bines seven planes in one in a compact and practical form. It is interesting to note, however, that while the tool combines only seven distinct types it accommodates cutters of different widths so that in reality it replaces many more than just seven planes. All metal parts are heavily nickel-

(Continued on page 52)

You Can Always Tell

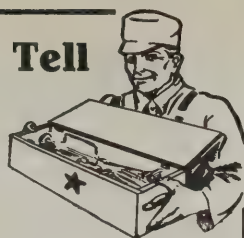
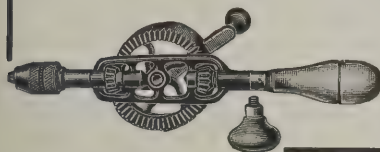
A Good Mechanic by His Tools and
the *best* Mechanic
because he is sure to have our

Hand Drill No. 5

A Drill unequalled in strength, durability, easy action and all-around excellence.
Has cut gears, ball thrust bearing and carries 8 wood boring points ranging from 1/16" to 11/64".

The way this tool is made insures long and satisfactory service—Try one.
Write us for a copy of our Catalog.

MILLERS FALLS CO.
28 Warren St., New York



You Can Qualify for the Boss's Salary

Don't envy the trained man because he gets a fat envelope on pay day. Make up your mind that you're going to *BE* a trained man and get a fat pay envelope yourself.

You *CAN* be a trained man. You *CAN* earn a large salary. No power on earth can hold you down but your own unwillingness to try. If you *WANT* a better job—if you *NEED* a bigger salary—the International Correspondence Schools can give you the necessary training to get it.

No matter where you live, how long hours you work, whether you are quick to learn or slow, if you can read and write and are willing to try, the I.C.S. will come to you in your own home, during your spare time, and give you the exact training your circumstances demand.

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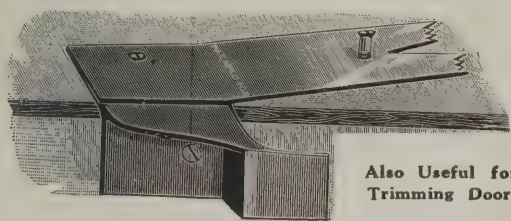
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Also Useful for
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Send 50c. for This Bench Hook Combination

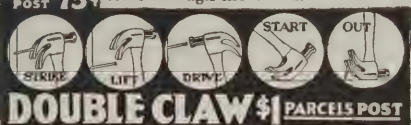
The handiest little tool ever made is Whipple's Carpenter Combination Bench Hook. Quickly adjusted to a temporary bench. The Hook is made of malleable iron and steel. Sent postpaid on receipt of price.

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ORDER THE "HYNALER" 75c

Best single claw hammer ever made. Holds the nail for high, low or far across driving. Grips plain part of nail so strongly as to pull the head of nail clear through the wood.



DOUBLE CLAW \$1 PARCELS POST

ORDER THE "DOUBLE CLAW" \$1

Best Hammer ever made. Holds the nail for starting to drive where you can not reach with two hands. Pulls the nail out straight without a block.

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Stanley Plumbs & Levels

All numbers are made of thoroughly seasoned selected stock. They have many special features which will appeal to CARPENTERS, MACHINISTS, MASONS, PLUMBERS, MILL-WRIGHTS—in fact to every workman who has occasion to use a Plumb and Level.

A STANLEY Plumb and Level can be readily identified by an ingenious device of blackening both plumb and level side views. This device concentrates the light directly on the bubble which with the patented feature of having two indelible lines at the crowning or central point of the glass, enables the user to very clearly and quickly locate the position of the bubble.

Many styles and sizes from which to make a choice.

For Sale By All Hardware Dealers.

ADDRESS

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

plated and the handle, knob and other wooden parts are made of selected rosewood. Carpenters and other workers in wood have long appreciated the fact that this is one of the most useful tools in their kit. It is not a complicated affair and it requires but little time for one to familiarize himself with its uses. With each plane is furnished ten plow and dado bits, seven beading tools, a filletster cutter, a sash tool, a match tool and a slitting tool, making altogether 21 separate cutters. The booklet in question contains a complete description of the tool, gives full instructions for operating it and shows the cutters which may be used in connection with it. A copy of the booklet will be sent to any interested carpenter who may send to the company for it. The plane, a general view of which is shown in Fig. 14 of the engravings together with its 21 cutters, is packed in a handsome steel box.

Modern Floor Finishing

The prevailing tendency to the use of hardwood floors in the modern home renders particularly interesting some comments on floor finishing which are found in a very attractive *brochure* sent out by the Bridgeport Wood Finishing Company, New Milford, Conn., under the title



Modern Floor Finishing. Fig. 15—Filling the pores of the wood

"Modern Wood Finishing with Bridgeport Standard Wood Finishes." The statement is made that the successful treatment of floors is a difficult problem to many people as they do not understand just how to obtain the best results. All that is necessary, however, is to carefully study the condition of the floor, having in mind the character of the finish desired, and then apply the proper finishing materials according to directions. In finishing new floors the floor must be first smoothly scraped and finely sand-papered and then the foundation for the finish be laid. The laying of the foundation in floor finishing is a very essential feature, it being relatively just as important as properly preparing the foundation for a house. After the floor has been filled either a varnish or wax finish may be applied according to preference. In Fig. 15 is shown



Fig. 16—Giving a floor a varnish finish

the operator laying the foundation for the floor finish by filling the pores of the wood, while in Fig. 16 is shown the operation for a varnish finish. The latter is generally used where floors are subjected to a great deal of wear and a finish of considerable body and luster is desired. On a new floor at least two and preferably three coats are applied. In the case of a wax finish which is very popular and preferred by many people the floor is first treated with a wood filler in paste form and then a thin coat of white shellac is applied, after which the



Favored Throughout the World

by discriminating tool-users. Their widespread use is one of the strongest arguments that can be advanced for

DISSTON SAWS TOOLS FILES

Quality Guaranteed

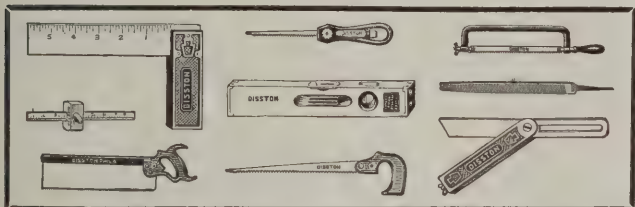
There is no surer sign of merit than an ever-growing demand for a particular brand of goods. The patronage of many generations of mechanics has made our factory the largest saw and tool works in the world.

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LENGTH	OF COMMON	RAFTER	PER FOOT	RUN	
DIFFERENCE	IN LENGTH	OF JACKS	16 INCHES	PER FOOT	HUN
FIGURES	GIVING	SIDE CUT	OF JACKS	VALLEY	RAFTERS
		CUT OF	OF HIP OR	IN VALLEY	OR HIP
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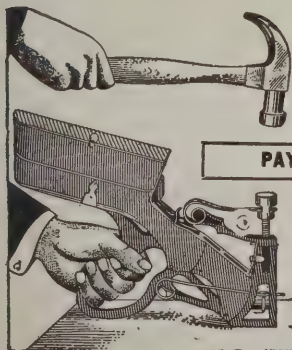
Every Carpenter Knows the Ordinary Lengths and Cuts of Rafters. It's the Odd Ones He Cannot Remember.

Our rule not only gives the lengths and cuts of rafters to frame the seven ordinary pitches of roof but gives the lengths and cuts of rafters for SEVENTEEN DIFFERENT PITCHES OF ROOF.

Send for our little Book explaining this rule. It's free.
NICHOLLS MFG. CO. Ottumwa, Iowa

Pearson's Automatic Shingle Nailer

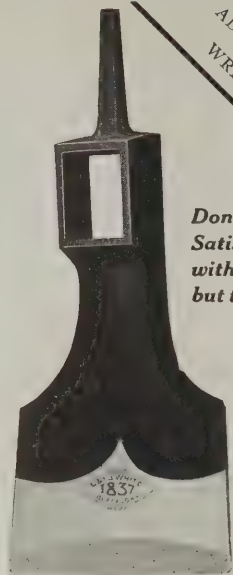
Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. Throw nails in by the handful—holds about 600 nails—start nailing. Nails can be driven through tin or quite heavy sheet iron. Made in two sizes: The BLUE Nailer for 3d common No. 14 gauge wire nails.



PAYS ITS COST ON ONE JOB

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Don't increase your work over a half by using dull tools. Buy those that stay sharp longer—in other words those that have the quality.

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If the SELF-SETTING PLANES are not sold in your town and you write us saying "I saw your trial offer in Building Age," we will send you particulars, a carpenter's pencil and our \$1.00

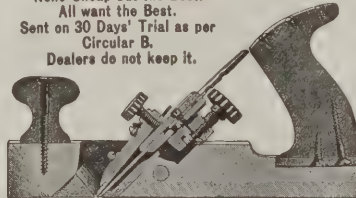
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All want the Best.

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O. K. ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained, caty, knurley, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT. If it is not worth to YOU, OR YOUR MEN, TWICE ITS COST, return it at our expense as above stated. If you send us the addresses of ten carpenters, no matter where they live, we will send you another hard, tough carpenter's pencil. Give the SELF-SETTING PLANE a chance to PROVE ITS WORTH. If it FAILS, return it and we will return your money. GAGE TOOL CO., Vineland, N. J.

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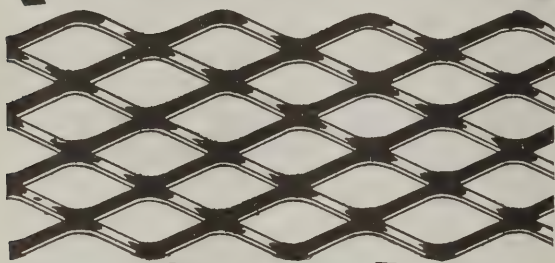
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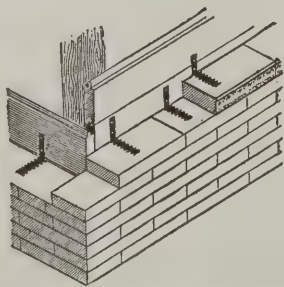
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floor is given two coats of prepared wax. In the case of old floors which are badly stained and worn, the old finish must first be removed so as to leave the wood in as nearly a natural condition as possible and ready to be refinished according to preference. If necessary to re-varnish the floor it should be washed with soap and water if needed, ending with clear water. It should then be well wiped and allowed to dry thoroughly; then lightly gone over with fine sandpaper and apply one or two coats of floor varnish.

Huber's Wood Mantels

A valuable addition to the library of the architect or builder is presented in an 88-page pamphlet just issued by the Huber Builders' Material Co., 48-50 Vine Street, Cincinnati, Ohio, which confines itself entirely to a pictorial presentation in half-tone cuts of the large number of styles of wood mantels carried by this company. Each style is given a certain number, and beneath each cut is given the dimensions relating to the particular style with a statement of the kind of wood and finish employed. In the preface of the book attention is called to the fact that the company not only has a showroom in which standard designs of various woods are exhibited, but also maintains a mail order sales department by means of which, with the aid of the illustrated style book, the prospective purchaser may order from a distance direct from the factory.

A New Power Saw Catalogue

The anti-friction rolling table is the special feature to which prominence is given in the new catalogue of the Beach Manufacturing Co., Montrose, Pa. The rolling of the table is accomplished by means of rollers connected by steel shafts and engaging two tracks, one secured to the under side of the table and the other placed on the main frame of the machine. Illustrative cuts and descriptions are given of the double cut-off saws, the double arbor and rip and cut-off saws, the combination rip and cut-off, the boxmaker's saw, the miter saws, the Dado machine and the various scroll saws manufactured by this concern.

TRADE NOTES

The Triple "A" Machine Company has just taken possession of its new office in Room 302 at No. 300 West Indiana street, Chicago, Ill., where it will be glad to see its out of town friends in the trade when they are visiting the city.

The Leader Iron Works, Decatur, Ill., with a New York office at 15 William street, has recently issued an interesting catalogue illustrating and describing a full line of gas and gasoline engines from 1 to 22 h.p. in which are incorporated suggestions of value to users of gas or gasoline power. The new Chicago Offices of the concern are located on the ground floor of the Monadnock block, to which they moved from the sixteenth floor of the same building, but steadily increasing business made this office inadequate. In the new quarters everything in the full line of Leader water supplies will be shown.

The York Saw Works, York, Pa., has recently enlarged its plant and installed new and up-to-date machinery in order to better handle its increasing business. It reports a most gratifying demand for its product and calls special attention to the fact that it sells all its band saws on approval. Among its other specialties is a good line of circular saws.

The Hartmann-Sanders Co., Elston and Webster avenues, Chicago, Ill., manufacturers of Koll's patent joint columns and porch material, has recently built four dry kilns, each 75 ft. long, 30 ft. wide and 15 ft. high. It has also installed a new 350 h.p. Corliss engine, manufactured by the Filer-Stowell Co., Milwaukee, Wis., which supplies power for the entire plant. The new kilns are of concrete and frame construction and will have a monthly capacity of one million feet of lumber.

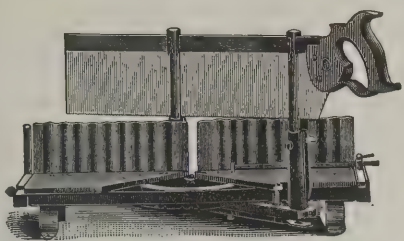
Asphalt Ready Roofing Company, 9 Church street, New York City, has been remodeling its works at Jones Point, N. Y., and some time before the 15th of June expects to have completed a new mill for manufacturing asphalt shingles. These shingles will be placed upon the market just as soon as the improvements under way have been completed.

A sketch pamphlet for the use of owners and contractors in the furnishing of data necessary for the design of heating plants has just been placed in circulation by the Brien Heater Co., Westfield, Mass. It contains two sheets of tissue paper over a cross section sheet intended for use in constructing the diagram of the first and second floors of a dwelling. A printed sheet of questions is also appended

(Continued on page 56)

Goodell Mitre Box

Made of STEEL—Cannot Break
First in Quality and Improvements



Automatic Stops for holding up saw.

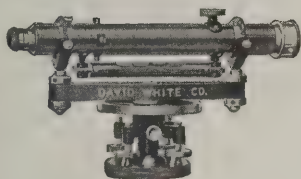
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is especially designed for work where a general purpose level is required. Telescope is 12 inches long, with magnifying power 25 diameters and will detect an error of 1-16 inch in 300 feet.

Written guarantee with each instrument.

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David White Company

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SEND \$1.00
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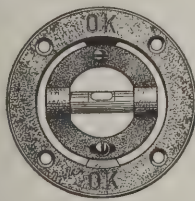
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embodying every practical, common-sense feature of all others, and these 2 features that no other saw set has: 1, adjustable side gauge to bring the point of each tooth under the anvil; 2, top clamp screw to regulate amount of set. Wearing surfaces made of hardened tool steel. Take advantage of the Parcel Post by sending \$1.00 for this attractive offer. We prepay postage.

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A Compound Level**

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Fir Porch
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Perfect guaranteed house paint—Single
\$1.20
per gal. in 5 gal. kit
We have all kinds of paint at wholesale prices.

All kinds of building hardware. You can't beat our goods or our whole sale prices.



\$838 We will furnish complete all lumber, millwork, hardware, spouting, paint—everything except masonry and labor to build 7-room house. Plans free. A113.

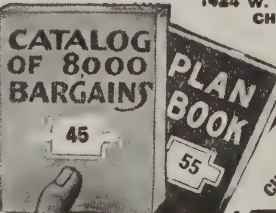
—whether you build now or not. Think of the actual savings, the high quality of all our goods, our binding guarantee of satisfaction and safe delivery. Fill in this coupon right now—mail it at once!

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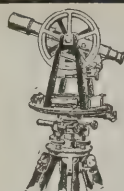
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HANNA QUALITY ENGINEERING INSTRUMENTS BEST IN THE FIELD.

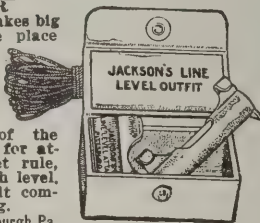
Reconnaissance Transit No. 50 shown herewith has compound socket. Graduations on solid silver. Lense system—the AOME of perfection. Send for catalog.

Transit No. 50
Price, \$115

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A UNIQUE TIME SAVER

The Jackson Aluminum Line Level makes big saving of time and labor. Takes the place of the old-fashioned sixteen foot straight edge. May be carried in vest pocket. No contractor, builder, carpenter, etc., can afford to be without. Stretch line and hang the level on it—it's positively accurate. Complete outfit goes into neat leatherette case and consists of the level with 40-ft. line also spring clamp for attaching level to steel square or pocket rule, thereby serving as a plumb rule or bench level. Ask your dealer or send \$1.00 for outfit complete post paid. Send for Tool Catalog. J. Woodwell Co., Sole Agts., 201-203 Wood St., Pittsburgh, Pa.



1853

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1913

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Buck Brothers' Tools are LASTING tools—they keep their edge.

We make a full line which includes bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.

BUCK BROS., Millbury, Mass.

Straight-Grained cedar that cuts like cheese; smooth, tough, leads that make clean-cut, strong marks—that's Dixon's Carpenter Pencil. Send 16c for sample lot. No. 32-J.

JOSEPH DIXON CRUCIBLE COMPANY
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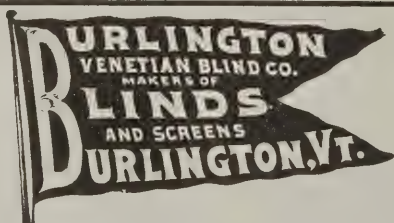
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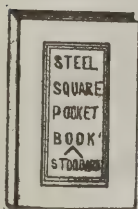
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ART STONE COMPANY

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On the Square



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159 Pages. 112 Figures. Price 50c.

Send for our catalog of selected books on all branches of the building trades.

BUILDING AGE BOOK DEPARTMENT
239 West 39th Street, New York

with blanks for detailed answers on the various points required for the design of the plant.

M. A. Preston and R. L. Walker have opened offices in the New Dime Bank Building, Detroit, Mich., to engage in the practice of architecture and engineering and will be pleased to receive manufacturers' catalogues and other trade literature addressed to Preston & Walker, 1925 Dime Bank Building, Detroit, Mich.

The Oscar C. Rixson Co., Chicago, Ill., manufacturers of door checks, has moved from its old premises at 540 W. Harrison street to 501 S. Jefferson street, where it occupies the entire sixth floor. The space is divided lengthwise, one-half being used for assembling and shipping, and the other half for manufacturing and office purposes. The area approximates 20,000 sq. ft. and doubles the company's former capacity of production. J. T. Ballen, formerly general manager, has severed his connection with the company and has been replaced by W. T. Ellsworth.

James R. Kimball has recently been appointed sales manager with headquarters at Jamestown, N. Y., of the Dahlstrom Metallic Door Company of that place. For more than 13 years Mr. Kimball was associated with the Art Metal Construction Company of Jamestown, and during the last few years he designed and supervised the sales of practically all the large bank installations made by the latter concern.

The value of constant and extensive advertising is the subject of an article in the April issue of *DooR-Ways*, the house organ of the Richards-Wilcox Manufacturing Company, 114 Third street, Aurora, Ill., in which it is pointed out that the enormous sums annually appropriated by the large advertisers return satisfactory dividends because of the reputation for quality which is given to the articles advertised. Attention is then called to the advantage of selling advertised brands of merchandise or of recommending such in building specifications.

The adaptability of hand grinders for the sharpening of drills, chisels, planes, and other tools is discussed in the new catalogue of the American Grinder Manufacturing Company, Milwaukee, Wis., in which it is shown that with the aid of the various racks and holders furnished by this company for use on its different machines, the building mechanic can with ease and rapidity accomplish the task of grinding his tools in a workmanlike manner. Two lines of hand grinders are carried by this company, the "American" and the "Champion" brands, the principal difference in the two being that the "Champion" is not provided with the positive oil retaining features which are found on the "American" grinder. The "American" foot-power attachment is listed, which permits the operation of the hand grinder by a treadle operated by the foot.

Valuable suggestions concerning safety appliances for woodworking machinery are contained in an article entitled "Preventive Appliances," in the May issue of "Lightning Line," the house organ of J. A. Fay & Egan Co., 221-241 West Front street, Cincinnati, Ohio. "Making Inside Trim on Fast Speed Matcher" is contributed by H. W. Simmons, and the central pages are devoted to a series of illustrations showing the making of wagon bows among the mountains of Arkansas.

Many of the readers of *The Building Age* will doubtless be interested in a very attractive booklet entitled "Text Book on Corrosion" and relating to the merits of Toncan metal, which has just been sent out by the Stark Rolling Mill Company, Canton, Ohio. The matter is divided into three sections, the first of which deals with technical information; the second is illustrative of some of the meritorious qualities and properties of Toncan metal and shows a few of the many prominent installations, while the third part is given up to sheets and products and also to numerous valuable tables, together with information on roofing, siding, standard weights, gauges, number of corrugated sheets in one square, rules of measurement, etc. Any reader of *The Building Age* who mentions the paper and is a consumer of sheet metal products can secure a copy of this work by writing to the company as above.

The May *Bulletin* of the Universal Portland Cement Co. contains an illustrated article showing a residence in Evanston, Ill., built with concrete blocks of three distinct colors and textures yet obtained, it is said, at a very slight additional cost over plain blocks. The house is one of creditable architecture, costing in the neighborhood of \$7,000, and typical of a great majority of suburban homes, with a garage built in the basement and generous porches. That as attractive a building as this appears to be is possible with concrete blocks is proof that the material is susceptible of much wider treatment than has been accorded by the average block maker and equally good results may be obtained by many architects if they understand what may be expected in this rather new material.

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BUILDING AGE



JULY 1913 · PRICE 10 CENTS



Increase the beauty and value of your houses by using

Hudson Asphalt Shingles

In Red and Green Colors.

Beautiful in appearance. They can't rot or fade being surfaced with crushed slate in its natural colors.

Neither Paint nor Stain required.

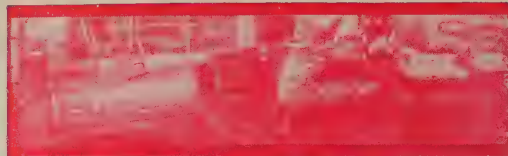
Easy to Lay and Inexpensive. Suitable for any house where shingles can be used.

Can be used for siding also.

Send for samples.

Asphalt Ready Roofing Co.

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For two months past we have asked: "Did you ever seriously consider your possible revenue as a parquetry flooring expert?"

Some have availed themselves of our proposition. We would like to tell you more about it. The only expenditure is a request for information.

There isn't a town or city in the country without good possibilities if the business is gone after intelligently. Parquet floors represent the utmost in flooring of par excellence for the consumer. For the man selling them they constitute a permanent source of substantial profit—because the extent of the business is gauged only by the ambition put behind it.

The world's largest producers of fine parquetry flooring want to communicate with energetic individuals willing to devote their entire time or portion thereof assisting us in further developing business—"going a begging" in their respective localities.

If you would like to know more about us and our products, let us send you a copy of our new booklet. No obligation is incurred by giving the matter your consideration.



WOOD-MOSAIC CO.

32 Hebard St., Rochester, N. Y.

Saw Mills and Flooring Factory
New Albany, Indiana.

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Bits for Service Shanks for Convenience

There is only one kind of bit that gives perfect satisfaction.
That is the

Russell Jennings

The correct double twist, the extension lip, the accurate clearance, and the clean-cutting spur insure the rapid true-boring, non-choking qualities so desirable in a bit. The crucible steel of which the Russell Jennings Bits are made gives them a long life of service.

The new turned shank is the latest improvement. It is quickly set up in the brace chuck and once placed cannot pull out or work loose. The true turned surface keeps it in rigid alignment. It is a great saver and makes the most convenient way of holding a bit.

Let your hardware dealer show you these tools.

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Rex-tile
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the Scientific—Handsome—Durable—Uniform—Waterproof—and Fire-resisting Shingle of permanent color.

Rex-tile's beautiful colors (red or slate) are not merely a mineral surface coating, but are a part of the roofing, and will never wash or wear off.

The only shingle that won't warp, curl up or blow up. The method of application absolutely prevents it.

If you want a water-tight and fire-resisting roof with all the distinctiveness of a permanent mellow red or natural slate color, use Rex-tile the Scientific Shingle.

Write to us for circular and full information.

FLINTKOTE MFG. CO. :: **BOSTON, MASS.**
New York Chicago New Orleans

THE BUILDING AGE

NEW YORK, JULY, 1913

A FINE TYPE OF THE MODERN SUBURBAN HOME

A Well-Planned House in Newton, Mass.—The Sleeping Porch One of the Growing Tendencies of the Present Day

THE charm of the suburban home is found in so many delightful features of environment and physical comfort that it is not surprising to find an enormously increasing tendency on the part of business men to live outside the congested zones of our cities. There is always a desire when the business of the day is over to get away from the hustle, bustle and confusion

ment, with its sleeping balcony over the end piazza, are features which the true lover of the suburban home cannot fail to appreciate. Interiorly the arrangement is on liberal lines and designed to meet the specific requirements of the owner.

Entering the house through a well-lighted vestibule and from a substantial porch with its many angled



*A Fine Type of the Modern Suburban Home—View in Living Room Looking Toward the Front of the House—
A Glimpse of the Glazed Door Leading to the Vestibule Is Seen Through the Opening into
the Main Stair Hall at the Right*

which are such nerve-destroying influences and seek the peace and quiet which come from a home surrounded by green lawns, beautiful flowers and nature's foliage. This tendency is strikingly illustrated in the many thousands of such homes to be found in every section of the country and none perhaps more numerous than in the environs of the historic city of Boston.

The subject of the present article is a typical example of this tendency toward the suburban home. Its location somewhat back from the street and surrounded by broad lawns and stately trees; its quaint exterior treat-

ment, the visitor finds himself in a commodious hall from which rise the main stairs leading to the second story. The stairs are of short flights having two landings in their course and well lighted by a quadruple window located about on a level with the floor line of the second story. An interesting detail of the main entrance to the house and also of the flight of stairs are to be found among the pictures that are presented upon the pages which follow.

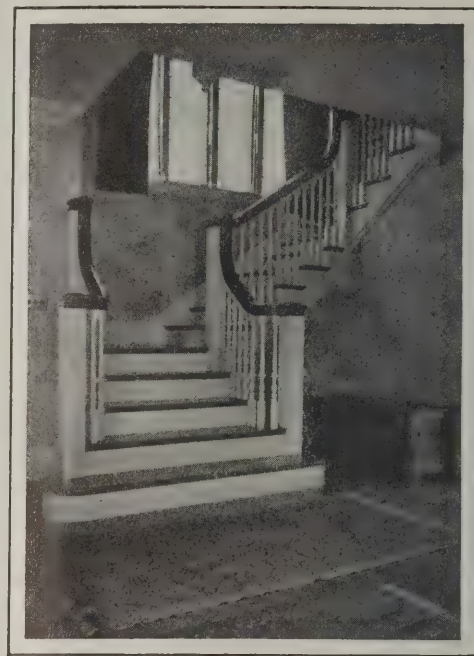
From the main hall at the right one enters the living room extended entirely across the end of the house and

having as its feature a broad low open fireplace with deep over-mantel finished in white. The living room is well lighted with windows on three sides and French doors give access to the piazza or porch directly under the enclosed sleeping balcony shown in the two exterior views. This sleeping balcony was added some time after

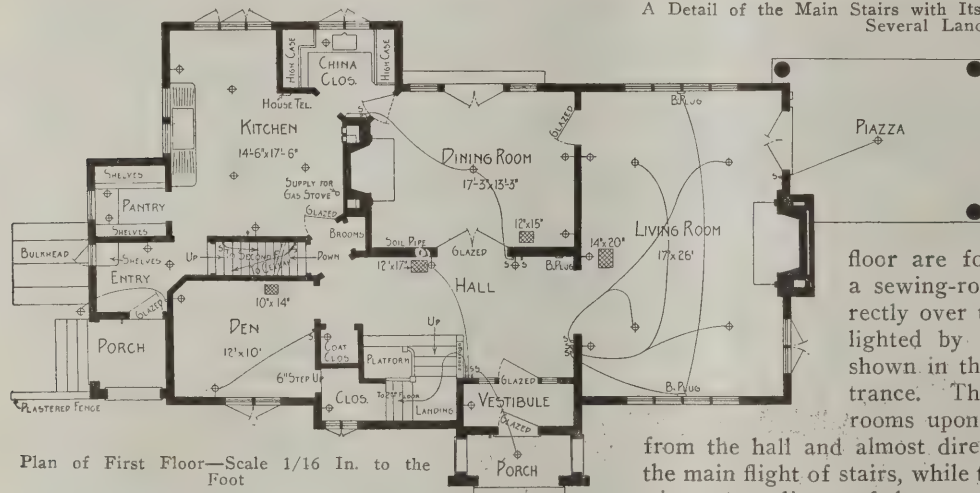
the sink being placed directly under the latter. From the passage between the kitchen and the main hall is the door opening upon the cellar stairs, while above



A Detail of the Main Entrance Showing the Quaint Roof Effect and the Casement Window to the Sewing Room Directly Above



A Detail of the Main Stairs with Its Broad Window Lighting the Several Landings



Plan of First Floor—Scale 1/16 In. to the Foot

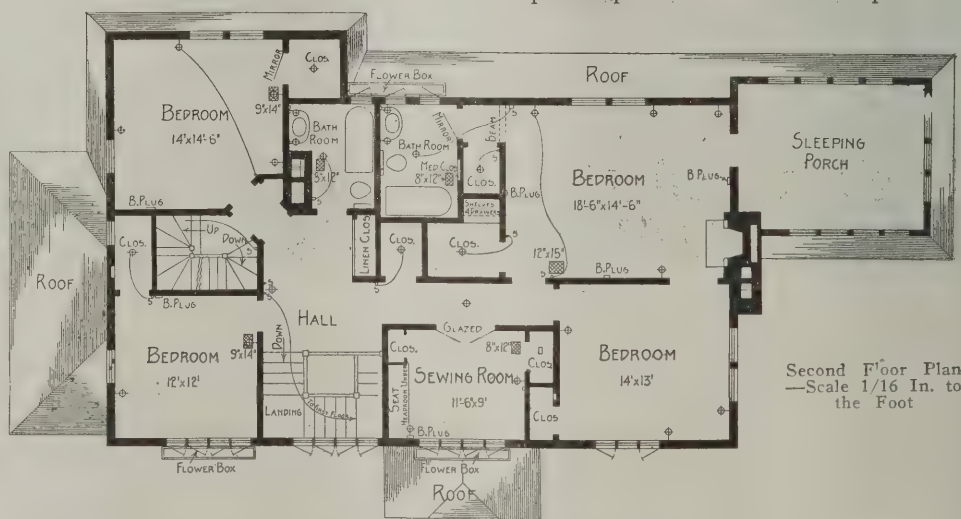
the house was originally completed and is an apt illustration of one of the tendencies of the present day in connection with our domestic architecture.

Directly beyond the main hall is the dining-room with its open fireplace and French or casement doors. Communication with the kitchen is established by a well-equipped china pantry amply lighted by double casement windows swinging outward.

The kitchen is so placed as to give direct access to the main hall so that one may reach the front door without the necessity of passing through any other room. The commodious kitchen pantry is lighted by an outside window, while the kitchen itself is lighted by means of a triple and a double window,

this flight are the rear stairs leading to the second story. The kitchen is entered from a side porch as shown.

On the second floor are four sleeping rooms and a sewing-room, the latter being directly over the portico entrance and lighted by a quadruple window as shown in the detail of the main entrance. There are also two bath-rooms upon this floor, one opening from the hall and almost directly opposite the top of the main flight of stairs, while the other bath-room constitutes an adjunct of the master's suite. In this front bedroom is an open fireplace and from it also opens the



Second Floor Plan—Scale 1/16 In. to the Foot

A Fine Type of the Modern Suburban Home—Plans and Various Details

sleeping balcony. There are ample closets in connection with the bedrooms and sewing-room, this being one of the very comfortable features of the entire arrangement. In the sewing-room is a seat so placed as to give

the head room required for the stairs of the main flight rising to the first landing. There is also on the second floor a linen closet so placed as to be readily accessible from the various rooms. The door to the closet in the rear bedroom has a mirrored front, as has also the door of the bath-room belonging to the master's room.

the servants' bedrooms in the third story and the floor directly over the kitchen were laid upon Cabot's Quilt for deadening purposes.

A feature of the floors of all of the smaller closets is that they are furred so as to be flush with the top of the thresholds, which greatly facilitates cleaning.

Electric lights are provided in the closets with outside switches, and the abundant installation of switches at convenient points for other lights has contributed largely to the comfort of the house as a place in which to live.

Gas is used in the service portions of the house for cooking and for lighting, and one emergency burner is placed in each room for lighting. These emergency burners are usually a mere tip inserted in the stem of the electric light fixtures and are inconspicuous.

A chute leading down from the kitchen range discharges upon a screen set at an angle of 45 degrees, thus automatically sifting the material dumped from the kitchen range into two separate pits in the cellar.

The house has piping for vacuum cleaner installation in the basement with switches on each floor.

The sleeping balcony over the end piazza recently added is fitted with "Whitney" windows installed by H. E. Holbrook Company, 49 Federal Street, Boston. These are something new to the section in which the house is situated and have a wide range of adjustability, giving free openings on three sides unobstructed by mullions, or a tight closure on any one or more as circumstances may require. The interior of this



A Fine Type of the Modern Suburban Home—The Street Front, Showing the Quaint Exterior Treatment and the Enclosed Sleeping Balcony at the Extreme Right

While the general construction of the house is not unusual the striking characteristics of the internal arrangement are its commodious rooms and ample closets. The standing wood finish throughout, except in the service portions, is painted white. As the rooms of the first floor have liberal openings into each other, with glass doors in some instances, the hangings and wall coverings were chosen with a view to harmony of color, consisting in the main of different shades of brown, which in combination with the white extending through the whole gives most pleasing effects.

The floors are of red birch slightly stained to eliminate the characteristic pinkish tint.

The dining-room, which is to the east, has windows reaching to the floor and French doors that let in a flood of sunlight at breakfast-time and make easy exit to the brick terrace without. Nearly the whole east side of the room is of glass, as may be seen from an inspection of the plan, and also of the half tone engraving representing the garden front of the building. The other windows in the first floor are of crystal plate glass set in wide leads which keep the individual panes true to plane and at the same time allow full and unobstructed window space.

The floors in the second story are of long leaf heart face rift Georgia hard pine. The bath-rooms and kitchen have red Asbestolith floors with 6 in. base curved at the corners which greatly facilitates their cleaning, while at the same time gives a surface that is pleasing to the tread. The floors of



Another View of the Living Room Looking Toward the Open Fireplace with the Casement Doors to the Piazza Just Beyond

balcony has a canvas floor with gentle pitch, cypress finish up to the level of the window sills and rough plaster like the exterior the rest of the way. There is also plaster between the rafters overhead, the interior of the room conforming to the exterior treatment.

The Whitney windows have rolling screens with Venetian blinds within, the whole combination of this type of windows, screens and blinds giving to this out-door compartment a maximum of convertibility so that means are easily available at any time to meet any condition of wind, rain or temperature, or of

The hot-water system for domestic uses is provided with a circulation pipe so that the water is always hot at the faucet, but as the owner regarded this arrangement as wasteful of heat he had a special valve inserted that would enable him to stop circulation.

The suburban home here illustrated is that of

Everett E. Kent, of the well-known law firm of Mitchell, Chadwick & Kent, Boston, and is located at 42 Waterston Road, Newton, Mass., the architects being Chapman & Frazer, 8 Exchange Place, Boston, Mass.

The contract was executed by William H. Iliffe, builder, Watertown, Mass.



A Fine Type of the Modern Suburban Home—The Garden Front with Another View of the Sleeping Porch

bright sky in the early morning or moths drawn by the evening light without sacrificing the free outdoor circulation of air.

The screens elsewhere in the house have narrow metal frames which either slide in narrow grooves as in the living room, or are hinged so that they do not appreciably obstruct the window area. In the case of the hinged screens a novel arrangement is used, the screen being made a little shorter than the window so that it will swing under the shade roller, while the balance of the distance to the top of the window is filled by a strip of wood. The shade being inside is then accessible without touching the screen and the screen swinging inward can be opened when desired without being obstructed by the roller shades. This arrangement was installed because the owner preferred to have the casements open outward and the screens inward, also that the shades be adjacent in the room and adjustable without touching the screens.

The house is heated by hot-air furnace, the owner believing that an abundance of fresh air in the house is both more important and more comfortable than mere economy of coal. The furnace was installed by the Ridgway Furnace Company, of Portland Street, Boston, Mass., and is unique in that the coals are held in a basket so that the air has access to all sides of the firepot. This results in very complete combustion. In the modern way of building furnaces with galvanized casing, cold air boxes, double pipes, ashes, gas and dust from the cellar have small chance to enter the living rooms.

shortly. The building will be located on the western end of the University campus and when completed will be the largest and best equipped forestry building in the United States.

Provision will be made in the basement for laboratories for timber-testing, and for investigations in the destructive distillation of timber. With this will be a very complete woodworking shop where students may become familiar with woods from the builder's standpoint. In addition to offices, class rooms and labora-

New Building for New York State College of Forestry

During the last session of the New York State Legislature an appropriation of \$250,000 was made for a new building for the College of Forestry at Syracuse University. The plans for the new building are in the hands of the state architect and it is expected that ground for the structure will be broken very



View in the Main Hall Looking Toward the "Den". Vestibule Doors Are Seen in Foreground at the Left and Dining Room at the Right

tories, there will be on the third and fourth floors an auditorium with a seating capacity of 1,000. This will take care of the winter lecture course upon forestry which was carried out so effectively for the first time during the past winter.

THE NEW LIEN LAW OF THE STATE OF OHIO*

Probably the Most Drastic Lien Law of Any Now in Force in the United States
—Owner Not Bound Further Than the Contract Price for the Building



THE new lien law just enacted by the legislature of Ohio and which goes into effect in August is perhaps the most drastic, considering the detail involved, of any now in force in the United States, although the owner is not bound further than the contract price for the building. While retaining a major part of the old law, the new statute contains features that are strikingly original and will no doubt prove cumbersome until the novelty has worn off and the operation becomes more or less mechanical.

The law provides that "The original contractor whenever any payments of money shall become due from the owner, part owner, or lessee, or whenever he desires to draw any money from the owner, part owner, or lessee, under such contract or upon the written demand of any mortgagee, shall make out and give to the owner, part owner, lessee or mortgagee or his agent, a statement under oath, showing the name of every sub-contractor or laborer in his employ and of every person furnishing material, machinery or fuel, giving the amount, if any, which is due or to become due, to them or any of them, for work done or machinery, material or fuel furnished to him, which statement shall be accompanied by a certificate signed by every person furnishing machinery, material or fuel to him in substantially the following form:

Form of Certificate

The undersigned certifies that to date hereof, commencing on the ____ day of _____ he has furnished machinery, material or fuel, as the case may be, to _____ for construction (altering, repairing, removing, digging or drilling, as the case may be) a certain _____, situated on or around, or in front of the following described property _____, and there is now due or owing to the undersigned the amount shown on the statement herein (or the undersigned has been paid in full therefor, as the case may be) _____.

It is held that this compels the original contractor to give the name of every laborer in his employ, stating whether or not he has paid them and that simply certifying that the laborers have been paid and not giving their names is not compliance with law. The law provides further that the Sub-Contractor shall deliver to the owner, through the general contractor, similar sworn statements, accompanied by like certificates. This is where the Ohio law differs from that of Michigan. Not only must the general contractor swear to his debts, but so also must the sub-contractor, and all of these statements must be accompanied by certificates from material men.

Money That May Be Retained

The law continues, "the owner, part owner, lessee or his agent may retain out of any money then due, or to become due to the principal contractor, an amount sufficient to pay all demands that are due or to become due to such sub-contractors, material men and laborers, as shown by the contractors' and sub-contractors' statements, for work done or machinery, material or fuel furnished, and pay said money to them according to their respective rights, and all payments so made

as between such owner, etc., and such contractor, and as between such sub-contractors and persons performing labor or furnishing machinery, material or fuel, be considered the same as if paid to such original contractor." In other words, in order to comply with the law and be safe, the owner must pay all bills direct.

"Until the statements provided for in this section are made and furnished in the manner and form as herein provided, the contractor shall have no right of action or lien against the owner, part owner, or lessee on account of such contract and the sub-contractor shall have no right of action or lien against the owner, part owner, or lessee, or contractor until he shall have furnished such statements, and any payments made by the owner, part owner, or lessee before such statements are made, or without retaining sufficient money if that amount be due or to become due, to pay sub-contractors, laborers or material men, as shown by the statements, shall be considered illegal and made in violation of the rights of the persons intended to be benefited by this act and the rights of the sub-contractors, laborers and material men to a lien shall not be affected thereby."

How Contractor and Owner May Be Protected

The law further states that in order that the owner may be protected, or that the contractor may be protected, he or his agent may demand at any time during the progress of the work in writing of the contractor or sub-contractor any or all statements herein provided for, which shall be made by the contractor or sub-contractor and given to the owner, part owner, lessee, mortgagee, contractor or his agent, and if such contractor or sub-contractor fails to furnish such statements within ten days after demand is made he is liable to a fine of \$100 and all actual damages.

Liens must be filed within 60 days after the furnishing of the last labor or material. The protection to the contractor in the way of liens is no greater than it was under the old act, but the owner is now compelled to look after the interests of every man engaged on his job. This, of course, in most instances means that the architects are to do it and that they will be held responsible by the owners. Joint conferences have been held at Columbus Builders and Traders' Exchange with the architects on the subject and an attempt is being made to be fully prepared for the law when it goes into effect so that there will be but little hindrance to the work.

The new department store of Lord & Taylor to be erected on Fifth Avenue at 39th Street, New York City, will cost \$2,000,000. A feature will be a concert hall with a stage on the seventh floor, a cold storage plant on the ninth and tenth floors, dining rooms on the tenth floor and a gymnasium on the roof. A distinguishing feature will be an automobile driveway in the basement allowing the loading and departure of delivery wagons directly from the inside, thus avoiding blocking the streets. The architects are Goldwin Starrett & Van Vleck, 45 East 17th Street, New York.

A movement is on foot in Florida to establish a State Board of Architects and provide for the examination and registration of practicing architects in that state.

*By John A. Kelley, Secretary of the Builders and Traders' Exchange, Columbus, Ohio.

AN ATTRACTIVE COTTAGE OF THE BUNGALOW TYPE

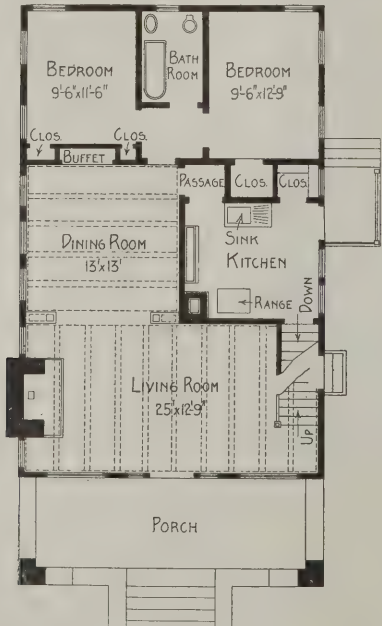
A Design in Which the Cobblestone Chimneys and Porch with the Sleeping Balcony Are Notable Features

IT is too frequently the case that the so-called "convenient" bungalow is on account of the tinyness and poor arrangement of its rooms anything but convenient and simple. The owner imbued with the idea of making his home compact, jumbles living and sleeping rooms together to the exclusion of the simplicity and convenience which is supposed to be a characteristic of this type of house.

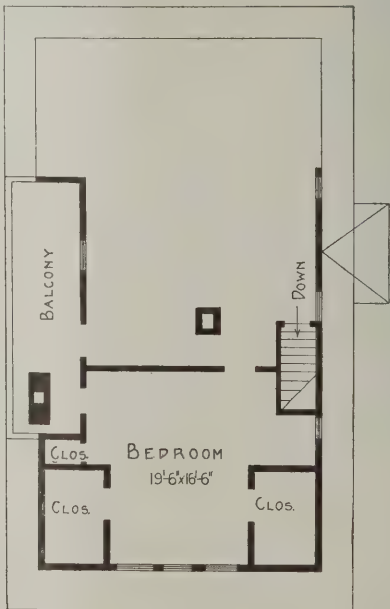
When a bungalow does combine attractiveness of appearance, simplicity of plan and the convenience and comfort of a large house it is worthy of more than passing attention. A most interesting example of this type and which forms the basis of this article is the home of Victor Moore at Morris Plains, N. J., and known as "The Cobblestones." What Robert Leigh McCormick has to say about this home in a recent issue



Photographic View of the Cottage of Mr. Victor Moore at Morris Plains, N. J.—Sleeping Balcony is Shown in the End Gable



Main Floor Plan—Scale 1/16 In. to the Foot



Second Floor Showing Sleeping Balcony—Scale 1/16 In. to the Foot

An Attractive Cottage of the Bungalow Type—Architect, W. B. Pierson, New York City

of "Suburban Life" cannot fail to interest a large number of our readers.

The exterior is attractively finished in brown and gray. The lower walls are of cement and the upper part of the house is of rough chestnut clapboards, each over a foot in width and all stained reddish brown.

The extreme width of these clapboards lends a distinctly rustic feeling to the house. The two outside chimneys and the foundations and pillars of the cement porch are of the cobblestones from which the house derives its name. The shingle roof slopes gradually toward the front and rear to the first-story level, and extends over the porch in the front.

The front entrance opens into a large living-room which extends the width of the house. At the one end is a staircase leading to the second story while at the other is a wide cobblestone chimney and fireplace.

The ceilings of this room and of the dining-room are

opening from the dining-room leads into this part of the house. There is a small, almost square, hall. To the left and right are doors leading into light, comfortable corner bedrooms. The bathroom, equipped with sanitary plumbing, is between the two bedrooms, and opening also in the little hallway.

These three rooms make complete sleeping-quarters. They are as distinct and separate from the living-rooms as if upon another floor, and yet there is only a step from them into the dining-room.

The second floor contains a big room which could be used as either study or bedroom, and an open attic. The room corresponds in position and size with the living-room below. It has a dormer window looking out on the highway, and also a glass door which opens into a little balcony.

This balcony is an interesting feature of the house. It is built as an extension of a recess in the outside wall,



An Attractive Cottage of the Bungalow Type—View from Dining Room Looking Across the Living Room Toward the Front Door Which Gives Out upon a Broad Porch Extending the Width of the Building

beamed, these beams being, like the rest of the interior woodwork, of brown-stained chestnut.

The dining-room opens from the living-room. It is a light, well-furnished room, 13 x 13 feet in size, and is parallel with the kitchen, the two rooms extending the width of the house back of the living room.

The kitchen opens directly from the dining-room. Here, again, is a recess in the wall in which the ice-box is placed. A door opens onto a side-porch from the kitchen, and there is also a door leading down the cellar-way. An abundance of shelves and closets and a practical arrangement of kitchen equipment result in a convenient and very satisfactory culinary department.

The sleeping-quarters extend across the width of the house looking out on the back yard, and are parallel to the dining-room and kitchen. A single door

and, with the projecting eaves for a roof, forms an admirable small sleeping-porch. Through one end it passes the cobblestone chimney. In the cold season, this porch is inclosed in glass and can be used as a winter sun-parlor or a sleeping porch as desired.

When the temperature becomes milder, the glass walls are removed and screens take their place.

The house is heated by steam, and has electric lighting throughout. The cellar contains the furnace, and also a model laundry and storeroom. Attractiveness of appearance, simplicity of plan, and the convenience and comfort of a large house combined here make a house that is truly worthy of consideration.

The cottage was erected in accordance with plans furnished by Walter B. Pierson, architect, with offices at 72 Trinity Place, New York City.

SOME COMMENTS ON "BUILT-IN" FURNITURE

Suggestions of Interest and Value to the Builder, the Cabinet Maker and the Carpenter, Who Is Especially Clever in the Use of His Tools

A SUBJECT which is of constantly growing interest among architects and builders in many cities of the country, especially where the fashion has been carried to considerable length, not only in designing private residences, but more particularly in designing modern apartment houses, is "built-in furniture." The fact is being forced on builders in these days of high rentals, that tenants who pay the first-class rates are entitled to more than is provided in most houses. An elevator and an imposing entrance hall are no longer accepted as full equivalent for the higher rates.

By built-in furniture is meant something more than a narrow little bookcase. Building managers who oversee the planning of apartment houses and apartment hotels for the estates in their charge are thinking a great deal about built-in furniture, and tenants are learning to look for it, says a writer in a recent issue of the *Record and Guide*. Economic conditions in New York City are changing. Young women have entered business life in large numbers; they have by so doing narrowed the opportunities of young men here, and have reduced the average wages paid to young men in clerical occupations.

New Economic Conditions

The consequence is that in order to make a home financially possible for many a young married couple in the city, the young wife continues to be a breadwinner as well as the husband. Their combined salaries enable them to live in better apartments than if they had to depend on the husband's wages alone.

Under these circumstances it is necessary and desirable to reduce housekeeping to the minimum amount. Luncheon on week days is always partaken of downtown, and the principal meal of the day comes in the evening at a neighboring restaurant. This is the type of family that is creating the demand for small suites and has caused the owners of many houses planned with large flats to make them over into smaller suites.

Both single men and women are demanding better accommodations than they have had in the past; in other words, hotel comforts for boarding-house prices. It will be found that built-in furniture will help to keep apartment houses filled with good tenants when plain houses are left with many vacancies.

Book cases of just the right kind will be found of great utility, and when these are installed in a house at the time it is built the cost will be considerably less than the cost of portable bookcases. Sideboards and china closets make the dining-room truly charming, no matter how simple and inexpensive they may be, provided a little thought is expended on their arrangement.

Comfortable Seats

In regard to built-in seats, a writer in the *Pictorial Review* recently said that often such a seat can be built in a corner where the wall forms one end, thus leaving only the other end to be provided. Seats should be boxed in to provide chests for storage, and covers should be provided which can be raised to give access to the storage space. Have the front board under a seat recessed so that in sitting down you will not kick the heels against the front. A comfortable sloping back should be provided and all dimensions should be carefully worked out—broad, low seats usually

being the most comfortable. Seats 24 in. wide and 12 in. high will be found very satisfactory when cushions 3 in. thick are added, making the total height 15 in. Drawers are frequently built in under a seat.

Built-in Sideboards

With a little skill it will be found possible to design and build a sideboard in the dining-room which will be much cheaper than a ready-made sideboard. This will have the advantage of "fitting the house." The easiest way is to provide an alcove for the sideboard by taking a little jog off the kitchen and building a simple chest of drawers below with cupboards for china above. Ornate sideboards of queer design will, of course, find no place in homes of good taste; but a simple design will be found very attractive as well as convenient, and such a piece of furniture undoubtedly pays the builder for his outlay.

China closets can be built in at about half the cost of ready-made china closets. In some houses two china closets are provided, being built in two corners with a window between. This is a very good arrangement. If the dining-room is small no sideboard is needed other than a simple chest of drawers between the closets. The price of simple cabinet work of this sort is surprisingly low when it is included in the contract for the house.

Wardrobe Door Mirrors

In the room of the husband and wife it is a good idea to provide two built-in wardrobes, so that each person may have ample storage place for his or her clothes. An excellent arrangement is to have a chest of drawers built into the space between the two wardrobes with shelves above. To carry out the scheme to the point of greatest comfort have full length mirrors applied to the panels of the two wardrobe doors. These mirrors take the place of an expensive cheval mirror and they will prove most convenient, as the woman can view both the front and back of her gown at the same time by swinging the doors to catch the reflection.

Waterproofing a concrete roof has been successfully accomplished by the use of a ½-in. coating of mortar in the proportion of one to two, applied before the concrete had set and troweled smooth. A solution of 1 lb. of concentrated lye and 5 lb. of alum was made up with 2 gal. of water, and used by diluting one part of it with 30 parts of water. A mixture of 2 lb. of cement in a pint of this diluted solution was applied in two coats to the fresh mortar. A large reinforced concrete pipe was also waterproofed in much the same manner and has likewise remained tight for several years.

The new club house, to be built in according with plans prepared by Architects George and Edward Blum, for the Freundschaft Society at 105 West Fifty-Seventh street, New York City, is estimated to cost \$150,000. Among the new club features will be indoor golf, indoor tennis, squash and handball. The roof garden will be finished in a most elaborate style and elevators and staircases will run direct to the roof.

CABINET WORK FOR THE CARPENTER—V.

Details of a Music Cabinet and Folio Case—Disposition of Music Records and Loose Leaf Matter

By PAUL D. OTTER



ORTUNATE indeed is the man of tools who is able to meet requirements as they arise, oftentimes being required to do things quickly for others, or in his more leisurely moments relieve himself of a certain amount of petty slavery to ill-adapted conditions, or entire lack of conveniences in his home surroundings. The music cabinet and folio case which we will discuss were the direct outcome of the constant experience of finding some long-searched-for subject at the bottom of the pack and vowing "When I get time I'll fix things differently." So the folio case now having been in most satisfactory use for some time, sprung into being, designed to take care of matter in a parted or "unit" manner—and the music cabinet—well we



Cabinet Work for the Carpenter. Fig. 1—General View of a Music Cabinet

kept buying records, and the song one wanted—that, too, was generally at the bottom of the pack.

While there are at present but two prominent makes of the phonograph, the one under consideration is the No. 8 Victrola, having a base measuring $15\frac{1}{4} \times 18\frac{7}{8}$ in. The instrument is an excellent one and the selection of this pattern without a lower stand or case was made with preference of putting more of the large instrument cost into buying future records rather than so much in an expensive outer case. With the base determining the size of the stand, the height, too, was also governed by the disposal of the 10 and 12-in. records, and, as will be seen in detail, Figs. 2 and 3, the height over all of the stand is $31\frac{1}{2}$ in. A good grade of easy running brass casters were well imbedded in the four places of contact with the floor, these being exposed about $\frac{7}{8}$ of an inch. The work of construction will prove to be interesting by following the plan of making six framed-up panels, all frames to consist of $\frac{7}{8}$ -in. material which before glueing up is treated with a $\frac{1}{4}$ -in. groove on the inner edge of stiles and rails to secure $\frac{3}{4}$ -in. veneer panels set back $\frac{1}{4}$ in. from front surface. The top frame is without a panel, and the bottom frame has the inner upper edge rabbetted to receive a solid wood panel to be smoothed off flush

with the frame. Make all frames glued up to a size, allowing for squaring and fitting accurately. The side frames being alike are set up in relation to the top and bottom frames in the manner indicated in Fig. 4 by bringing them against the edges of the back frame by

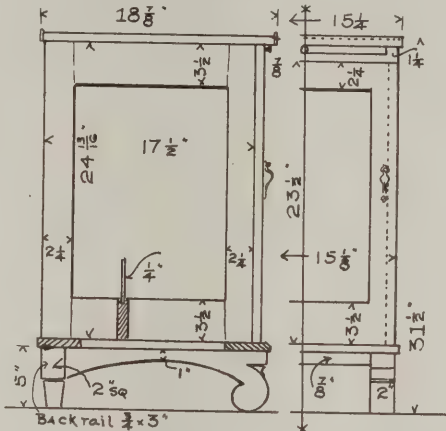


Fig. 2—Side View of Cabinet
Fig. 3—One-half Front View

means of screws. To avoid evidence of screws on the side frames, bring them up in glue to back frame by means of long clamps, and apply finishing and glueing strips on the inside as shown. Through these, screws or brads may be set alternately.

It will be noticed that the front door, which is finished to $15\frac{1}{4} \times 23\frac{1}{2}$ in., fits with a slight overhang in front of the side frames and immediately under a filling in strip $\frac{7}{8} \times 1\frac{1}{4}$ in. wide which is cut out to allow of the sliding shelf "A" to be drawn out to a proper length and stopped with a screw or checking strip. This shelf will be found very convenient when using the instrument to lay records upon. A rabbetted slide is, of course, screwed to the sides and top for this movable shelf to slide over. The case now being set up, the base may very readily be fitted and secured by screws to the underside of the bottom.

By a paper or wood pattern drawn and cut out, mark and saw from a 2-in. dressed plank the two Colo-

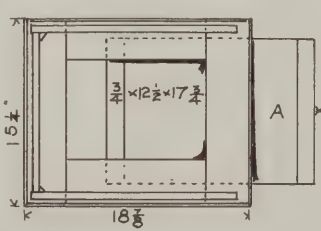


Fig. 4—Showing Top Frame and Slide Shelf "A"

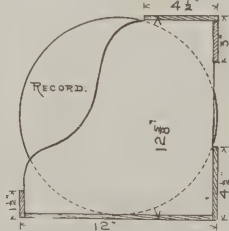


Fig. 5—End of Portable Record Holder

nial base pieces. Then give more definition to the upper part of the scroll by cutting a line with a V-tool, and using a gouge to hollow above it, as shown, on both sides of each piece. The work of cutting a tenon on the back end to enter the posts, and cutting a mortise to receive the small front apron, may then be done; likewise fitting a tenoned back rail, $\frac{3}{4} \times 3$ in. The back

legs, which are 2 in. square, it will be noticed, are reduced by a slight taper below the arching sides. All parts being carefully fitted, they may be glued up in the nature of a frame and screwed to the underside of the bottom framing.

One glued-up panel provided with grooves and tongued battens at each end is reduced to $\frac{5}{8}$ of an inch in thickness and fitted loosely to the shape of the interior of the cabinet. This divides the hight into space for 12-in. records below and 10-in. above the shelf board. The means of support may be by projecting pins, similar to those used in bookcases.

When the final carcase work is completed, a finishing strip is neatly blind nailed with small brads to the edge of the top frame, all around, as shown in Fig. 4, and indicated by a projection on Fig. 3. Prepare the strips to $\frac{3}{16} \times 1$ in. with miter ends and have them well warmed and applied with hot glue, sinking the brads and filling the holes with sawdust putty. This strip makes a proper molding in continuation of molded base of the instrument, which sets snugly within. Screw holes bored diagonally up through the top of the stand—one on each side toward the front and one at the back—will permit of the instrument being held to the case. Great care should be used in making the door to the front of the cabinet fit very

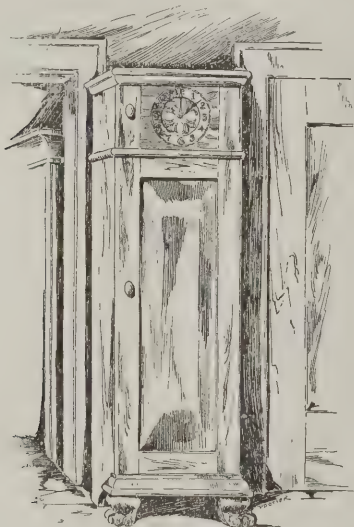
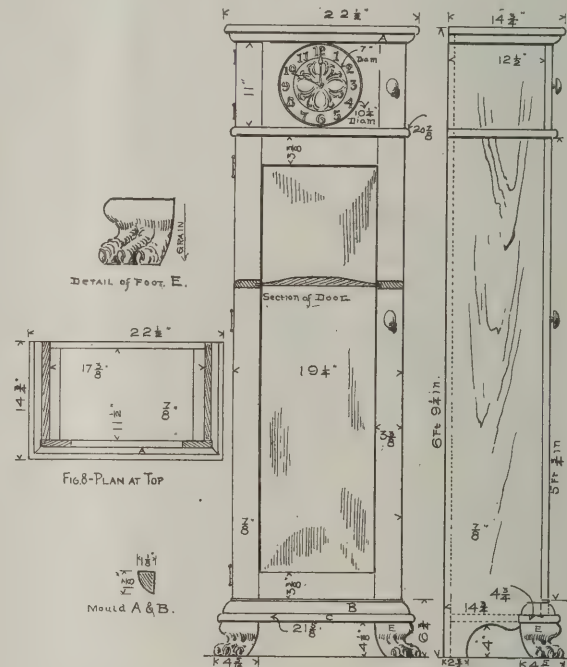


Fig. 9—General View of Folio Case

storing place frequently is a reason for many to discontinue—shall I say the habit of collecting. The writer is well aware from long experience that there is a medium to be adopted between the extremes of not collecting and collecting too much. There is hardly any field of activity in which a man may engage but what he would be greatly benefited; in truth, progress in, by being always on the lookout for further developing information in that line. This source of information is available, and is very frequently free to him in a pamphlet or loose-leaf form.

I am thinking just now of the enterprising carpenter, the prospective contractor. You are at liberty to further inform yourself along any line you wish for the price of a postage stamp or a post card—look over the advertisements and the invitation is always open to you. Much information of value is thrust at you as you walk about an exposition of whatsoever kind.

The most valuable form of loose-leaf knowledge is through the current magazines, not only your trade papers, but your family magazines—read and look



Figs. 6 and 7—Front and Side Elevations of Folio Case

Cabinet Work for the Carpenter—V—By Paul D. Otter

closely, as dust should be guarded against. Use two $1\frac{3}{4}$ -in. hinges with loose pins, and the new thumb spring latch will be found to hold the door tightly closed, and yet readily opened. Two light removable cases to hold the two sizes of records should be provided to readily slip in on the bottom and middle shelves. These cases are made of thin material and cut to the outline shown in Fig. 5. The ends and divisions being of the same pattern, the bottom, ends, back and front pieces should be $\frac{5}{16}$ in. thick, while the division panels, which are set in grooves about 1 in. apart, may be of $\frac{1}{8}$ -in. material. It is desirable to have the cases portable for several reasons, one of which is more readily to attach a label bearing number of letter to the front of each compartment so that there will be no difficulty in locating or putting away records. A corresponding list should be kept in a book or on a stiff card, which indicates a certain division or divisions to be used for vocal, another instrumental, another talking, and so on.

To those who are desirous of being in intimate touch with information regarding their line of work, it will be found after many months or years, that it becomes quite a task to refer to some certain topic without spending much valuable time looking for it among a mass of collected matter. The absence of a proper

them over for they will broaden you. You will say many times: "There is an article I want to keep"; cut it out. Building plans, or other features of home building, articles on sanitation, location and all kindred subjects can be withdrawn in this way from a mass of matter which experience teaches becomes a burden if hoarded in its entirety.

So this folio case deals with the systematic accumulation of such loose-leaf matter withdrawn and obtained from many sources. In one pile it would be quite as useless as that article you were so much interested in a year ago and which you admit now you can't recall just where you did see it.

To briefly add to the information given on Figs. 6, 7 and 8, it might be explained that the larger magazines, like the *Ladies' Home Journal* and others, decided the inner size to be $11\frac{1}{2} \times 17\frac{3}{8}$ in., while many years' possessions regulated the hight over all to be 6 ft. $9\frac{1}{2}$ in. These dimensions then suggested the use of a clock, and to all appearances every one takes it for a grandfather's clock, while in fact the clock is simply screwed to the reverse side of the small swinging door covering the upper compartment as shown, marked by a false mold on the sides and projecting in like manner to part the lower and larger door. The

attractiveness of this cabinet depends upon the use of well selected wood in either quarter or figure of grain. This cabinet is plain white oak with a pronounced figure which is interrupted only by a mold blind screwed to the sides, and the stiles of upper door are cut from same length of material as the long lower stiles.

Finish of the Cabinet

The entire cabinet being finished in a rich nut brown wax finish makes a very handsome hall piece. The long panel of the lower door is spoke shaved into a fiddle-back shape from a $\frac{7}{8}$ -in. board until it is reduced to $\frac{3}{8}$ of an inch in thickness along the edges and sloping into a pretty curve to middle of board. When making the frame, provide a groove in the center of the inside edge to receive the panel, but in gluing up the frame under clamps or clamping device, leave the panel unglued to come and go without danger of future cracking. The disposition of parts is shown in the plan of under part of top, Fig. 8, which is a plain board, $14\frac{3}{4} \times 22\frac{1}{2}$ in., with the back construction frame contained within the solid board sides, and the front door overlapping these as shown, the sides being screwed to $1 \times 1\frac{1}{4}$ -in. cleats "D," which have been glued and screwed to the top. The molding "A," which is secured from $\frac{7}{8} \times 1\frac{1}{8}$ -in. stock, is then framed around two sides and front. It is again used in a reverse manner to trim the front part of C, which is an extended and exposed part of framed up bottom contained within the construction as shown in the plan, Fig. 8.

The Back of the Cabinet

The back of the cabinet consists of a construction frame with stiles the entire length and with top and middle rail. The bottom rail is raised from floor to be on a line with bottom frame "C." The frame consists of material 3 in. wide, with a rabbet on inner side to receive thin filling in the panels. While the carved claw feet make a very desirable base treatment, the shape of the foot "E" may be used without the carved detail, although a trial block may demonstrate that you have more skill than you think in this direction. After the block is sawed out both ways to shape, mark out the five toe points and cut in the deep gullies by a very quick curve gouge, or large V-tool, then proceed to give the rounded form by using a low curve gouge giving form and expression to each division and finally imitating the claw in front of each ball. Amateur effort in carving will show less in imitating a bear claw by not attempting fine detail, rather let it be reasonably rough and rugged to indicate strength, which is the purpose.

The Clock in the Folio Case

The beveled rim shown by the two diameters on the middle panel of the upper door was produced on a large lathe, screwing a $\frac{15}{16}$ -in. board to the face plate and turning a flat bevel from $10\frac{1}{4}$ to 7 in. in diameter down to within $\frac{1}{8}$ of an inch of back, when the inner part was removed by sawing out on a jig saw. The panel was then fitted with a tongue on each end and the stiles with corresponding grooves, the three parts being glued up and faced off smooth and fitted with hinges to swing like lower door.

A good clock works was secured back of an etched copper dial plate, the work of which will be described later if any are interested in preparing a dial plate which will possess some distinct design or embody an initial or monogram, which in after years will give greater value to the subject so treated. The clock figures were from stock pattern in cast brass.

The cabinet has been considered up to its final completion as an open case, and it now remains to provide at least fifteen light loose panels $\frac{3}{8} \times 11\frac{1}{4} \times 17\frac{1}{4}$ in. of bass, or white wood, which when sanded all over

should immediately be shellacked to keep them straight. These are the "unit" divisions which are supported on four hardwood $\frac{5}{16}$ -in. dowel pins on both sides of the cabinet. The boring of the holes should be done before the cabinet is put together, boring them at a vertical distance of $3\frac{1}{2}$ -in. centers and to a depth of $\frac{5}{8}$ in. Pins may be sawed $1\frac{1}{8}$ in. in length and round pointed. After your loose-leaf matter finds a temporary resting place on these sliding panels, later rearrangement will naturally follow, when neatly printed labels can be glued to the panel edge, indicating that particular shelf panel is for certain pamphlets, another for catalogues, another for plans. One or more should be set aside for the use of the family upon which may be stored from time to time the really beautiful and meritorious pictures, poems or other instructive matter which might be removed from magazines or other sources. The children should have a shelf or two for their cut outs, their bird and nature pictures. Make it a cabinet not only of "last resort," but an ever-available consulting point for every one, and when once installed, there will be no doubt of its value to all.

Production of Slate in the United States

According to the United States Geological Survey in an advance chapter on slate, the production of that material in the United States in 1912 was valued at \$6,043,318 which was an increase over 1911 of \$315,299. Of the amount produced \$4,636,185 represented roofing slates, the production of which was 1,197,288 squares.

The roofing slate industry has shown a general advance since the first report of the Geological Survey in 1879, when the number of squares produced was 367,857 valued at \$1,231,221. The record production was in 1902 when 1,435,468 squares were produced and the greatest value was in 1903 when it amounted to \$5,345,078.

In 1912 there were produced 2,898,742 square feet of blackboard material and 4,482,571 school slates.

Probably one of the most important economical devices in the slate trade is the machine for splitting the slate. As now produced the making of roofing slate is nearly all done by hand by a dressing gang of three men—a block maker, a splitter and a dresser. The mechanical device does away with the dressing gang and makes the slates it is claimed more rapidly, more perfectly and more economically.

Objection to the use of the mechanical slate splitter has been made on the ground that some of the slates are full of ribbons and other defects which would break up the slate under the machine. The ribbons and defects, however, are not a condition of all slate and the defective slates would break under hand-splitting as well as under the machine.

Another point in favor of the splitting machine is that it will split blocks which have become somewhat dry through the loss of their quarry water on continued exposure to the air. It is almost impossible to work up slate of this character by hand and it has hitherto always found a place on the dump.

Those of our readers who may be interested in further details can secure a copy of the report on slate by application to the director of the Geological Survey, Washington, D. C.

At the forty-first annual meeting of the London Master Builders' Association officers for the ensuing year were elected as follows: President, Walter Lawrence, Jr.; first vice-president, W. F. Wallis; second vice-president, Edmond J. Hill, and treasurer, William Downs.

MOVING AN EIGHT THOUSAND-TON BUILDING

A Notable Operation Involving the Moving of a Three-Story Brick Schoolhouse a Distance of Several City Blocks

THERE is now in progress in the city of San Francisco the moving of a modern steel frame and brick structure known as the Commercial High School Building for a distance of several city blocks and which has involved features that render the operation the most notable of its kind ever undertaken on the Pacific slope. The building is three stories in height, covers an area 180 x 120 ft. and is estimated to weigh something more than 8000 tons. It occupied a site in the new Civic Center at Grove and Larkin streets, and as it was necessary to clear this space the removal of the schoolhouse was imperative. Its new site is at Hayes and Franklin streets and in its journey it has thus far been moved an average of something over 30 ft. per day.

In its progress it was moved over vacant ground a

of 12 x 12's and 14 x 14's, the lengths ranging from 24 to 40 ft.

In Fig. 1 of the illustrations we show the building as it appeared resting upon its cribbing and immediately after it had commenced its journey, two of the donkey engines used in pulling it being shown at the extreme left in the picture.

In Fig. 2 of the illustrations is a view looking toward the end of the building and with the three donkey engines used in hauling it in the foreground.

In Fig. 3 is a closer view of the blocking, clearly showing the manner in which it was used, also a view of one of the hauling cables, as well as of a number of the jacks used in raising the building.

In lifting the structure from its foundations men were stationed at the jacks and upon a given signal



Moving an Eight Thousand-Ton Building—Fig. 1—General View of the Structure Resting on Its Cribbing and Ready for Its Journey

portion of the way; passed through several old excavations and in crossing Hayes street a multitude of trolley poles and wires had to be removed. In its progress it was turned so that while originally it faced south it will face the east in its new location.

In carrying out the work 2000 steel rollers 2 in. in diameter by 2 ft. in length were used; 1400 jacks for raising the building from its foundation; 1,000,000 ft. of lumber; 100,000 red cedar shingles which were used as thin wedges in the delicate leveling work; 20,000 carefully cut oak wedges; 150 tons of steel plates; 5 miles of steel cable, and three donkey engines providing in the neighborhood of 800 tons of cable pressure. The working crew numbers 75 men.

The skids or timbers that support the building while the moving operation is in progress consist

the screws were given a quarter turn, this being the usual method of procedure in connection with work of this kind. After the building had been lifted to the required height the skids were placed, the rollers put into position, the donkey engines started and the journey commenced.

In doing the work every precaution was taken in advance to guard against any spreading of the walls under an irregular strain, for the contractors were under a heavy bond—said to amount to nearly \$175,000—to place the building upon its new foundations in as good condition as when it left the old ones. In fact, every structural detail of the building was studied by those having charge of the work, and in order to secure timbers of the proper kind to be used in the construction of the track and cradle it was necessary for the con-



Moving an Eight Thousand-Ton Building—Fig. 2—Looking Toward One End of the School-house with the Donkey Engines Ready for Hauling in the Foreground

tractor to send a logging crew into the woods and cut trees from which the long skids were sawed.

At the end of May the building had reached the corner of Van Ness avenue and Grove street and completed 700 ft. of its journey to the new site. A partial turn of the building is necessitated through Van Ness avenue, as that thoroughfare is not wide enough to permit of the building being moved broadside down the street.

The contractor for removing and replacing the foundations of the Commercial High School Building is the Sound Construction & Engineering Company, which after preparing the building for its journey sublet the moving contract to the Nichols & Handley Company of San Francisco. Mr. Nichols expressed the belief that after leaving Van Ness avenue the movement of the building would be more rapid, as there is a 2-ft. down grade, while in the early part of the operation the building had to contend with a slight up grade.

It is expected that the building will rest on its new foundations by the first of August. The Commercial High School Building was only recently completed at a cost of something over \$260,000 and we understand

the contract price for moving the structure and placing it upon its new foundations is something like \$150,000.

A Mammoth Bakery Building

What without doubt will be one of the largest bakery buildings in the country is the nine-story reinforced concrete structure which has been planned for erection in Long Island City in accordance with designs prepared by Architect William Higginson, 13 Park Row, New York City, who estimates the cost at approximately \$1,000,000. It will cover a plot 200 x 430 x 382 ft., fronting on Thompson Avenue, Queens Place and Orton Street, in the city named. It will provide a floor space of approximately 800,000 sq. ft. and will be occupied by the Loose-Wiles Company of Kansas City, Mo., and Boston, Mass.

The Building Trade Credit Association, of Cleveland, Ohio, organized about 15 years ago, has just been incorporated. It is composed of concerns dealing in builders' supplies and materials.

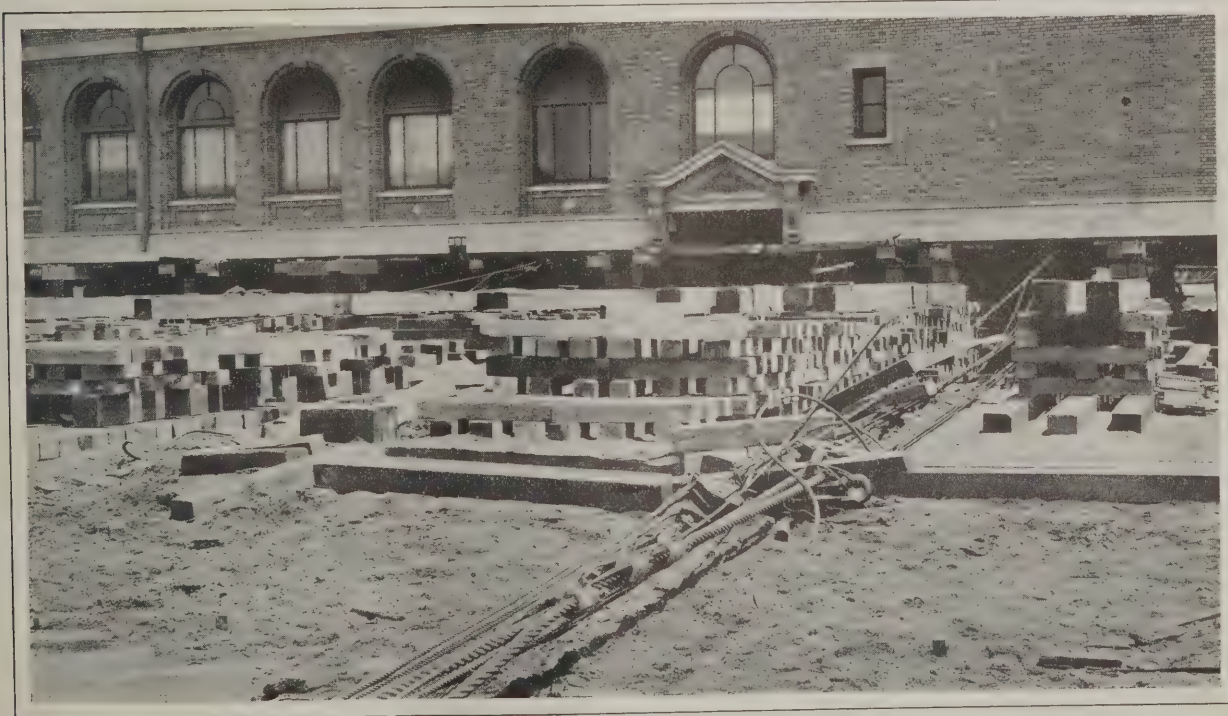


Fig. 3—A Close View of the Blocking or Cribbing Showing Some of the Jack-screws in Place; also a Portion of One of the Cables Used in Hauling the Building to Its New Foundations

GOthic-ROOFED HOUSE OF CONVENIENT, INTERIOR

Plans, Elevations and Constructive Details of the Dwelling Which Forms
the Basis of The Colored Cover Design This Month

THE roof is the noticeable feature of the house selected for our cover design this month. This roof is of the kind which Ruskin meant when he said,

"The best and most natural form of roof in the North is that which will render it most visible, namely the steep gable; the best and most natural, I say, because this form not only throws off snow and rain most completely and dries fastest, but obtains the greatest interior space within walls of a given height, removes the heat of the sun most effectually from the upper rooms and affords most space for ventilation."

Continuing, he says:

"In Picardy and Normandy and many towns of Germany where the material for building is principally wood, the roof is made to project over the gables, fringed with a beautifully carved cornice and casting a broad shadow down the house front. The principal charm of all those continental street effects is dependent on the houses having high pitched gable roofs."

The roof in this case becomes the most important decorative feature of the house. It has dark red shingles which form a good contrast with the light toned stucco-finish walls. In Germany at the present time architects are designing four and five-story houses with these long sweeping roofs.

The architect does not follow out this Gothic style in the design of the windows, but, like his German contemporaries, takes the small-paned window of Colonial design, omitting, however, the green shutters which usually accompanied the latter.

The "Study" and the "Sewing Room"

Two welcome provisions for the various activities of the family are to be noted: the 12 x 15-ft. study on the first floor and the 8 x 10-ft. sewing room on the second. As will be seen from the elevation, the study is provided with a plate-glass paneled door leading to a small porch at the rear of the house. Two ample book cases with leaded glass doors occupy the wall space on either side of this door and above these cases the architect suggests decorative illuminating fixtures—two above each case.

A brick fire place of Colonial design, with tall andirons and a mantel shelf with a decorative panel above it, are placed in the 15 x 24-ft. living room, which is directly entered from the front door. The main stair case leads from this room to the second floor. The dining room is furnished with a large bay window facing toward the rear of the house and with a china closet. A pantry connects the dining room with the kitchen. The latter is provided with ample drawer and cupboard space. A door leads from the kitchen to the cellar stairs and another to the entry-way, in which is space for the refrigerator.

The Second Floor

The second floor is occupied by three bed rooms, a sewing room and bath room. All of the bed rooms are well lighted. The largest has two closets and a fire place, while the other two bed rooms have one closet each. There is a linen closet easily accessible from the hall. The stairway is lighted by a window at the end of the hallway. The sewing room, entered through the large bed room, is lighted by a double window and provided with a closet.

The design calls for a cellar to occupy one half of the plan area of the house. The foundation walls, piers, etc., are constructed of standard high grade concrete with spread footings under all walls and piers. These footings are 6 in. thick and the piers 8 in. The cellar floors are leveled and laid with a bed of cinders

and finished with a coat of cement. The cellar walls were whitewashed on the completion of the work.

The main walls of the building are constructed of hard-burnt hollow tile blocks and the exterior walls are finished with stucco, brought to an even surface. The interior of the main walls is plastered directly on the hollow tile surface.

The porch floors and hearths are of Moravian tile laid on a bed of concrete. The bath room is tiled. The chimneys are of common brick laid on a spread footing of concrete. The flues are lined with clay flue tile and should have long easy bends to insure proper draught. Brick arches are turned under hearths, etc.

Finish of Various Rooms

The first floor plastering is 3-coat work; the last coat to be finished with sand, natural, or as directed by the owners. Wood lath is used for all interior stud partitions. The second floor has sand finish for bed rooms and hall. The bath room is hard finish, with wainscot of Keene's cement, blocked off in imitation tile. The attic is unfinished.

The lumber for wooden girders is of yellow pine and that for the floor beams of spruce and hemlock. Other framing and rough work is of hemlock. Studs are doubled around all openings. The roof is covered with dipped cedar shingles.

The floor beams are 2 x 10 in., the studs 2 x 4 in., the roof beams 2 x 8 in., all placed 16 in. on centers, and the plates are 4 x 6 in.

All gutters and leaders are of extra heavy galvanized iron. Step flashing is used around chimneys at their intersection with roof, also at all ridges, valleys, hips, etc. That in the valleys is 20 in. wide. The leaders are supported with adjustable galvanized iron hangers, placed every 4 ft.

The hot water system is used for heating. All radiators and exposed pipes are bronzed and ceiling and floor caps are used where pipes break through floors.

A Detailed Estimate of the Cost Follows:

Excavating	\$ 80.00
Grading	40.00
Masonry	1,375.00
Concrete and cement.....	569.00
Plastering	340.00
Mill work and carpentry.....	1,454.00
Painting	190.60
Plumbing	316.90
Heating	260.00
Metal work.....	95.00
Tile and slate.....	146.00
Manteis	40.00
Gas and electric work.....	270.00
Hardware	57.00

\$5,232.60

Based on a unit price of 19 cents per cubic foot, the total cost of this house would be \$5,232.60, the cubical contents being estimated as follows:

	Cu. Ft.
House, porches, etc., 27 x 40 x 23 ft. (height) =	24,840
Cellar, 20 x 27 x 5 ft. (deep) =	2,700
	27,540

This amount at the unit price of 19 cents makes the total cost \$5,232.60.

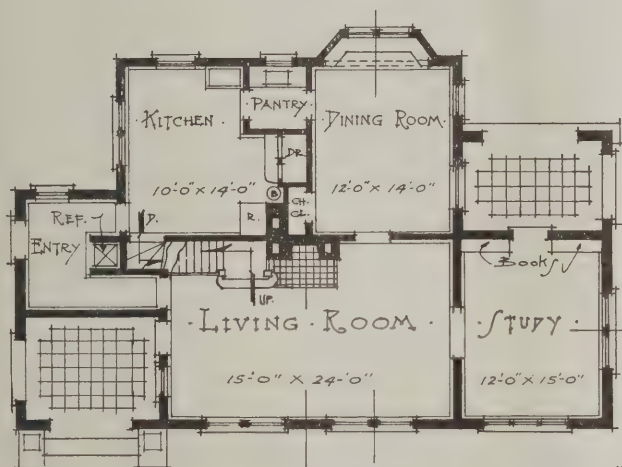
The house was designed and the specifications prepared by Frank T. Fellner, Architect, care of *The Building Age*, or 413 Caton avenue, Brooklyn, N. Y.



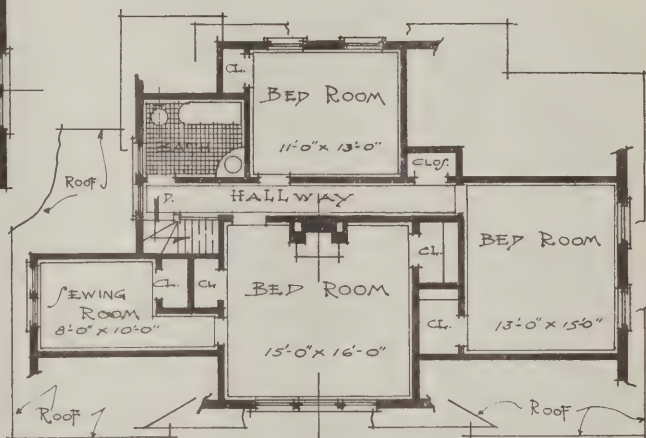
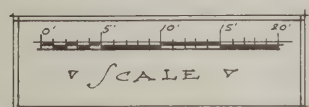
▽ FRONT ELEVATION ▽



▽ SIDE ELEVATION ▽



▽ FIRST FLOOR PLAN ▽



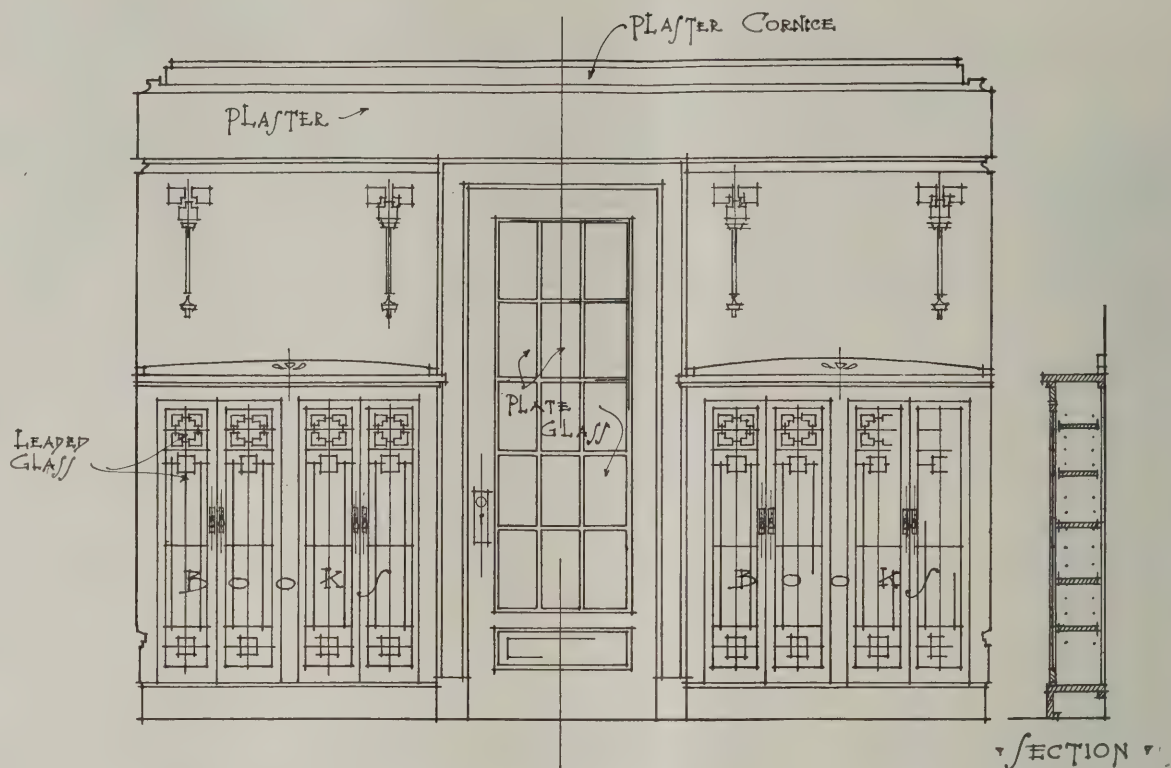
▽ SECOND FLOOR PLAN ▽



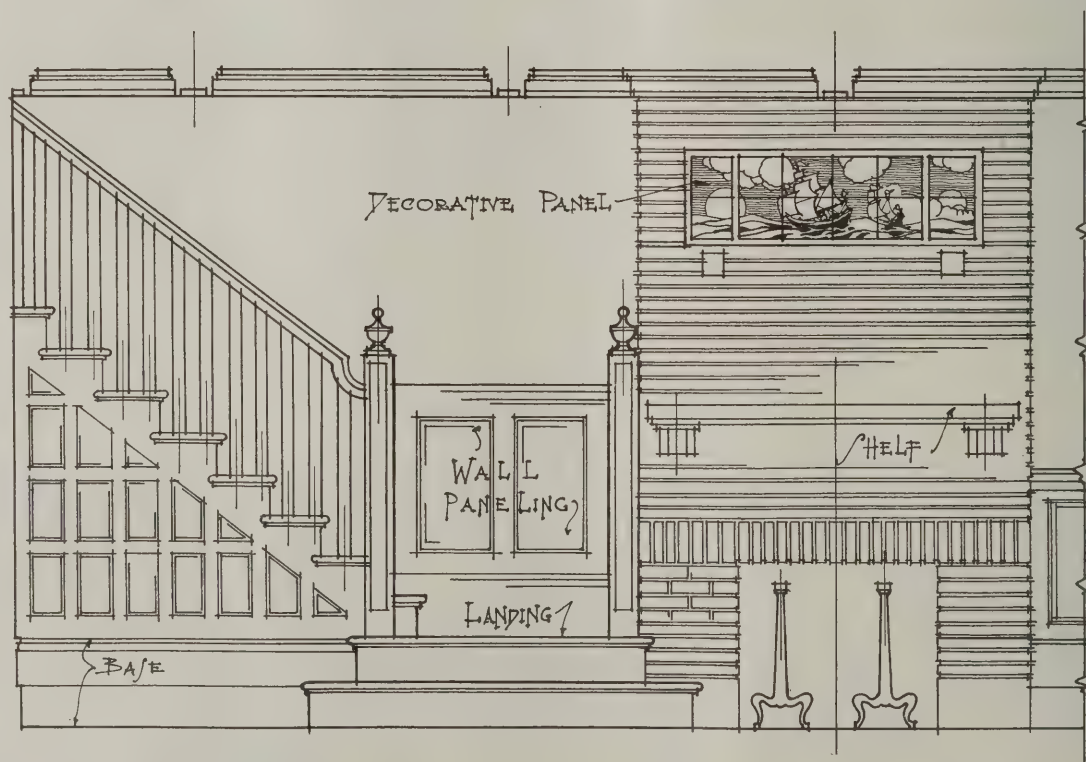
▽ REAR ELEVATION ▽



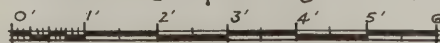
▽ SIDE ELEVATION ▽



◁ ELEVATION IN STUDY TOWARD PORCH ▷



◁ LIVING ROOM STAIRS AND MANTEL ▷



SCALE FOR DETAILS

VALUE OF APPRENTICESHIP IN SKILLED LABOR

Tendency to Speed at Expense of Workmanship One of Main Causes Rendering Present State of Affairs Unavoidable

BY JENS C. JENSEN



IN this country of great opportunities, where things are done in no time, and towns grow up in a fortnight, there is an evil tendency—which ought to be conquered—to do things fast at the expense of their not being done so well. Those who are born under its restless wings may not realize it; but to those who have come from abroad, and who have learned their trade in one of the European countries, it appears so much stronger and appeals with so much more force.

This tendency is noticed more or less in all branches of mechanics, but especially, perhaps, in the building trade; poorly built houses and the frequent collapses of buildings, often half finished, are the proof and evil consequences thereof.

To discover a remedy that would put an end to such things may be a hard and difficult task, and if required to be done at once, an impossibility, as the competition among the builders often makes it necessary to do a cheap job in order to make the undertaking yield a profit. Hence it is not the aim of this article to criticize the builders, but to try to point out one of the main causes which makes it a necessity to continue with this state of affairs.

The main cause lies—in the opinion of the writer—not so much in the competition among the contractors, in the prices paid, or the time allowed to do the job—though these of course are facts to which no little attention must be paid—but in the inability of the workmen. When a boy or young man starts in to learn a trade, the very first thing he ought to know, is not *how fast* a thing can be done, but *how* it is done, and *why*. The *how's* and *why's* should be the main corners in every young mechanic's knowledge and ability. But it is not. The young man in the building-trade starts in as a helper; he saws boards and drives nails, and does odd outside jobs, while the skilled men do all the better work. If the helper is intelligent he watches the skilled man and notices how one thing and another is done and in that way he little by little learns many of the *how's* in the trade. As soon as he thinks he is sufficiently posted he no longer desires to work as a helper, but digs right in as a skilled man, and as a rule carries the wages of such. The "why's" in the trade are in many cases never learned, and when they are it is often through bitter experience and at the loss of money or materials either to himself or others. Such casualties would be avoided if the "how's" and "why's" were shown and told to the young man at the beginning, and the "do-it-fast" principle acquired as his skill increased.

To illustrate the value of this method let me say a few words about the way in which a trade is learned abroad—not thereby saying that the same means ought to be enforced in this country; but a comparison may give a hint to some other way by which the same results would be acquired.

When a boy in Scandinavia, for example, is 14 or 15 years old and through with school, it is decided what he is to do in the future, and in what branch of life

he is going to spend his years of apprenticeship. If he prefers to learn a trade, it is discussed which offers the best opportunities, and for which is the boy best qualified. If the carpentry trade is chosen, the case is talked over with some prominent master builder, and when an agreement is reached as to the length of the apprenticeship and the wages, a contract is set up to make the agreement binding. Such a contract contains an obligation of the master builder to show and teach the boy each and every turn in the business to such a degree, that the boy at the end of the apprenticeship, which is generally 4 or 5 years, shall be able to do any kind of work, belonging to the trade, with entire satisfaction, and to pay the boy a certain amount of money—generally very small—every week. The master likewise agrees, at the end of the apprenticeship, to give the time and money required to put the boy through a mechanical test, which is held twice a year, conducted by the Board of Trade in connection with the technical school, and to a certain degree controlled by the government.

The boy on his part is obliged to stay with the master for the time appointed, to do his every bidding concerning the work, and to attend the technical school three or four evenings a week in the winter-time. When this contract, which is issued in printed form by the government, is filled out, it is taken to the city office, where in the presence of witnesses it is signed by the interested parties and sealed by the mayor.

The boy is now in the hands of the master, and little by little he learns the business in the shop or on building jobs. In the technical school he learns drawing, and the theoretical side of the trade.

At the end of the apprenticeship comes the test which is often a severe one. The young man is given a certain piece of work to do—a tower to build, a difficult roof to construct, or some other odd part of a building to lay out and put together. He has to make his own drawings, which must show every detail of the work. The work itself is done on a miniature scale, but must be properly proportioned as to the carrying capacity of timbers, etc., and everything exactly as it should be on a practical job. Everything must be done by the young man himself, without even the slightest chance of consulting superiors, and it must be done within a given time.

When the work is finished and passed by the Board of Trade, the young man is given a diploma, or in case it happens to be "excellent," a prize. Medals of gold, silver and copper are used as such, and it is the ambition of every young mechanic to get one of these. They are not very plentiful, however, and it takes more than common skill to win them. When the young man gets his diploma, he often becomes a member of some union or traveling society and as such takes a trip—often on foot—to other countries. In that way he learns of other ways of doing things.

The difference in the ability of such a man, and one who has learned the trade, without ever being a real apprentice, is easily noticed; and it is worth considering how much cheap and unsatisfactory work could be avoided by the establishing of some binding rules, as a guard to the apprenticeship in this country. This could be done in different ways, either by the state officials, the boards of trade, or the labor unions.

ATTRACTIVE DOORWAYS FOR THE HOME

Features Which Mark the Home as a Place of Refinement—Some Excellent Examples of Colonial Doorways and Entrances

BY WARFIELD WEBB

THE true value and distinctive merit of a home with an attractive entrance or doorway has been overlooked by some of our present-day builders, and in some localities the charms afforded by this feature have never been enjoyed. In the New England as well as in many of the Southern states, this idea was for years a notable one in home building, and is still in vogue with a number who cling with a love still burning to the styles of a generation or so ago.

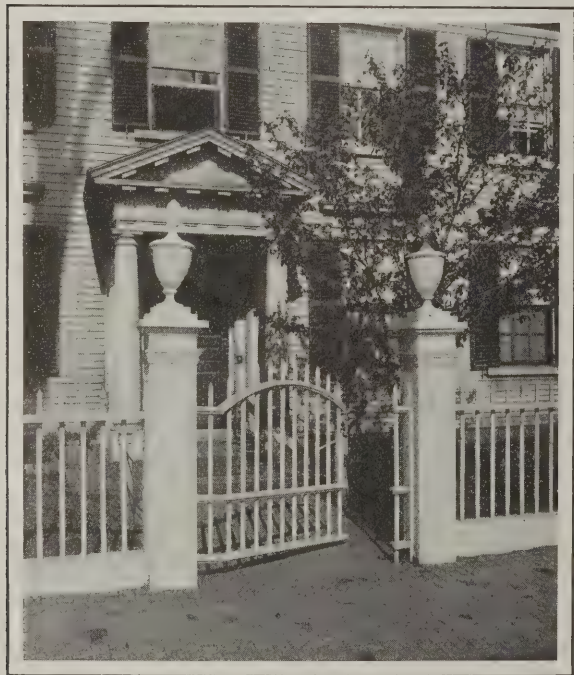
In addition to the Colonial doorway, there are also the Colonial gate posts and entrances—artistic and distinctive by reason of their beauty. These are generally built of wood, made to special order after designs formulated either by an architect or by a contractor who has a special gift in making possible these features in home construction. It is by no means a difficult matter for the latter individual to undertake this work if he gives the subject care and study before he assumes the actual operation. The great danger in all work of this kind—work that demands the man with a little foresight and a clear head—is that he takes too much for granted and is unable to carry his plans to completion without serious consequences.

There is nothing about a home that so marks it as a place of refinement and puts it in a class that at once demands admiration as the attractive doorway, and added to this the equally attractive fence and gate posts. There must, however, be a distinctive feature in either or in both to make them worthy of this claim to honor. The designing and the labor of construc-

big cities there is liable to be less of this kind of work done, owing to the greater congestion and to the fact that in very many cases this work is placed in the



A. Colonial Entrance With the Doorway Framed in Creeping Vines



Attractive Doorways for the Home—A Style Very Popular in New England

tion are by no means tasks above the man with brains. This work has or at least should have a special attraction for the carpenter-contractor operating in the small city or in towns with a larger number of country homes to cater to with work of this character. In the

hands of the architect who plans the homes. Still there is an increasing number of apartment buildings which have been adorned with the Colonial porch or the latter style of entrance. Its special features cause many to favor it, and this is a helpful indication of a return to the good old days of home construction ideas.

In the towns and in the country proper, there are a large number of home owners who wish a distinctive feature in connection with their abode, and the entrance doorway and the gateway makes this possible with many features of special beauty. One finds these homes many times erected with wood, and the use of the blinds, small glass window frames and kindred features add to the charm that is made by the Colonial porch and gateway. It matters not whether the houses be a long or short distance from the street proper, there is the same artistic effect possible with the use of the gateway.

The views shown herewith give a fair idea of the real beauty of these features, and also give one a conception of what styles of materials are used for the purpose. One would not think of using anything but well-seasoned lumber for this character of work, and the design should be given particular consideration as applied to any given home. What will look attractive on one home may look very much out of place on another structure. The design then should bear a distinctive feature all its own to insure a proper treatment of the plan.

This is applicable to the doorway as well as to the gateway. How are we to arrive at this conclusion? The individual home should be studied with care by

the builder. The doorway should not be too large or too small for the remainder of the house, so as to make it appear out of proportion. Then there is the simple doorway with the stoop and the more elaborate doorway with a small porch with columns, and sometimes with a balcony. The cost of the varying styles should be looked into well in advance, and the estimate given be based on what the work will actually cost. Now to make this a clearer matter, it would be well to first secure the general idea of the owner as to his wants. Make a rough sketch of these and forward them to a company making this work as a feature. Ascertain the kind of stock wanted, the varying details and the other data. Then ask for the prices as per each kind of stock that will possibly be used.

By being explicit on this point and by making it a clear matter for the manufacturer, he will be enabled to act with celerity and intelligence. The number of columns, of posts, the amount of balusters, rails, newels, and other material needed should be made plain. The kind of stock used for this work is not confined to one style, but there are several kinds of timber that have proven satisfactory. Cypress, red and white pine, red gum, poplar, fir and some other kinds of stock, after being well seasoned in the air, are sure to give satisfaction. The prices, of course, will vary both as to style and kind of stock, and there is every reason why ample advance information should be sent with any specification for work of this kind.

The columns for the porch work are either round, octagonal or square, as the choice may be, but the gate posts are usually square, to give them a more distinctive effect. As will be noted in the illustrations, the gate posts have an additional ornamentation in the nature of an urn or vase, thereby setting them off artistically. If care is given to the matter in advance there will be no trouble in making the work a simple affair. The stock can be made and cut to measurement, if so desired, and there will not be any great labor to

style in work of this kind, and then there is the difficulty in being forced to carry so much stock on hand.

The manufacturers who give special attention to this kind of work are enabled to do so with simplicity. They are daily making stock of this kind for many users. They have the capacity for so doing with ease. They are in a position to undertake all this work with



Here the Quaint Door Latch Marks the Entrance as of Colonial Days

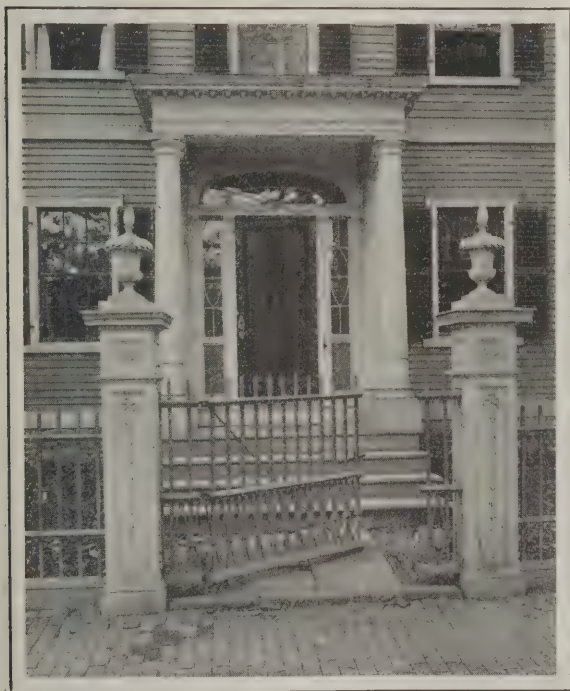
rapidity and there will be no danger of errors if there has been a proper specification sent them. The stock carried is large and select. They are prepared to handle great numbers of orders, and to do this satisfactorily capital is demanded. The builder who orders this kind of work will be relieved of a vast amount of worry and his profits will be larger with less effort.

Columns of built-up timber have proven of exceptional value in work of this kind, and the man who can seek and carry out work of this higher order is the man who will be able to keep busy. The renewal of these features is making it possible to develop a class of men who are above the ordinary run of builders. It demands men who have artistic ideas, and who are also capable and painstaking. The demands are there, and the men who are striving for something higher in the building world have some splendid opportunities here for their hands and brains. Note the trend in this day for Colonial feature work, and it will be a source of surprise to see the extensive opportunities that are now opening up and which demand men who are well able to handle the work. It will give them an opportunity that has been denied them in the past and will make it possible for them to earn a greater wage than before while placing themselves in a class of men who are in everyday demand by architects and contractors.

Standard Sizes of Brick

At the recent convention of the Alberta Clay Products Manufacturers Association held at Calgary, a standard size for brick was adopted—8 x 3¾ x 2½ in. for common brick and 8¼ x 4 x 2½ in. for face brick.

The Department of Architecture at the University of Michigan has established a two year course for special students, this being in addition to the regular four year course now offered.



Attractive Doorways for the Home—A Dignified Entrance Emphasized by the Ornamental Gate Posts Which Guard It

put it in place after being received. Some builders may feel that they can order a given amount of stock or carry it regularly and thereby save something in this kind of work. This is an error. The difficulty is that there will be no two home owners who wish the same

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

A Convenient Farm Barn

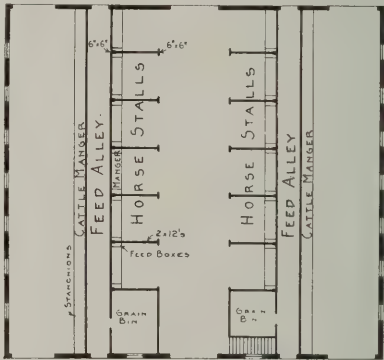
From Albert J. Weier, Cavour, S. D.—I am a constant reader of *The Building Age*, and find it a great help to me. Thinking some of the other readers may be interested in a barn which I recently built at this place, I am sending a photograph of it, together with a plan



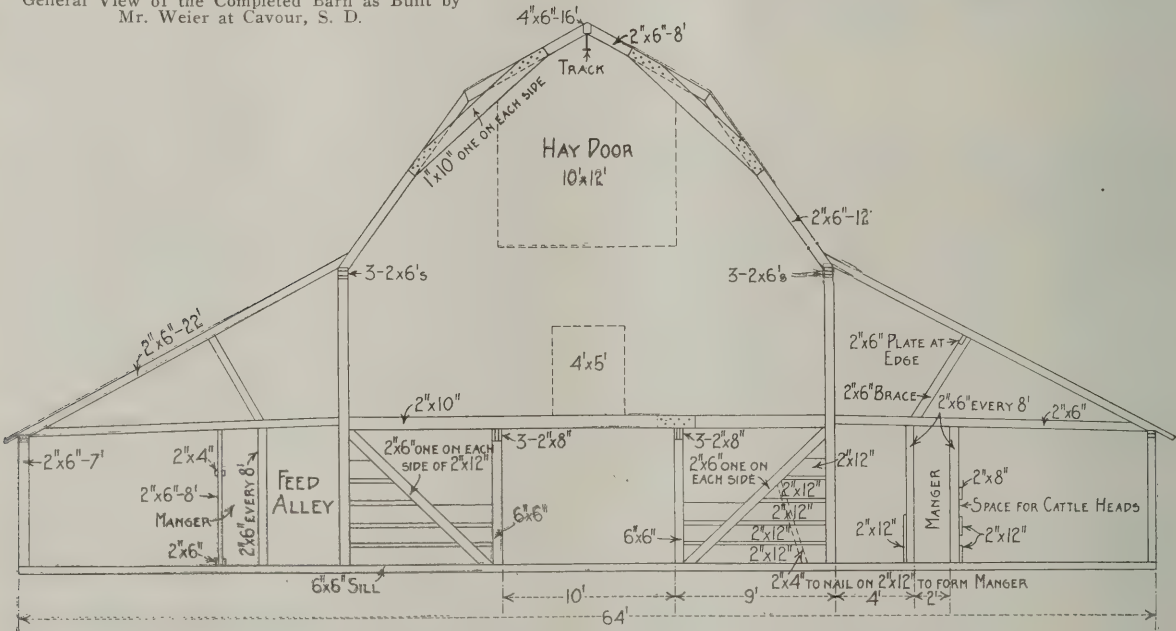
General View of the Completed Barn as Built by Mr. Weier at Cavour, S. D.

Preventing Moisture in a Kitchen Cupboard

From Builder, Clinton Co., N. Y.—My suggestion to "M. E. T.," Batavia, N. Y., whose query asking how to prevent moisture in a kitchen cupboard appeared on page 185 of the April issue, is to cut a small window into his cupboard for light and ventilation; then let



Plan of Barn—Scale 1/32 in. to the Foot



Vertical Cross Section Showing the Framing

A Convenient Farm Barn—Albert J. Weier, Builder, Cavour, S. D.

and an elevation showing one of the bents. The sizes of the principal timbers are indicated on the elevation so that I think the practical reader will understand pretty well the method of framing which I used. The plan shows the arrangement of the horse stalls and the position of the cattle, with feed alleys extending along in front of the stanchions and mangers. It also indicates the position of the feed boxes as well as that of the grain bins. The outside of the barn is covered with 6-in. drop siding nailed to 2 x 6 studs. The roof is covered with shingles exposed 4½ in. to the weather.

a 2 in. conductor pipe down from the top, allowing it to go outdoors as high as he can. This will cause circulation, for dead air is the seat of his trouble. The pipe could run down to the bottom of the cupboard. His outside walls are cold and cause inside condensation.

Louvre Windows on the Roofs of Barns.

From John L. Shawver, Bellefontaine, Ohio.—Apropos of the discussion of the subject of louver windows in towers, etc., it may not be without interest

to mention the results of experience with louvre windows on large barns. The practice, or perhaps more accurately speaking, the "fad," of placing louvre windows on the roofs and in the sides of barns was quite prevalent 40 years ago, but is no longer in vogue because very little benefit was derived from them and at the same time they were a source of constant detriment to the building. They were expensive to begin with and as roof ventilators they frequently cost \$40 to \$75. After the owner had seen a year's results from them he would frequently express the opinion that he would give an equal amount to have them removed. Rain and snow would blow in through them regardless of the amount of slope given the slats, and hay and grain which might be stored beneath them would in a short time be ruined and in a few years even the floors would be more or less injured.

When these slat windows were placed in the side walls of the barns they were equally injurious. Science teaches that hay should be placed in a bay where light and air cannot come in contact with any more surface than can possibly be avoided; hence the side walls of all barns are now made as nearly air and light proof as possible. This permits only the top of the hay and the side next the barn floor to exposure to the light and if these parts were covered with canvas it would be all the better.

We always urge all the glass windows in the stables that may be conveniently located, because animals must have light, sunshine and air as well as food. In northern latitudes we frequently double glaze these windows if some system of ventilation is to be used, in order to secure more comfort, but the windows should be easily opened either on hinges or by sliding vertically or horizontally.

In the superstructure, however, it is different, for here we advise no windows at all save over the large

of pieces may be readily found. There is in the bookcase room for four shelves, which should be movable, resting on small wooden pins or upon the little metal shelf-rests that are made for the purpose.

From A. A. T., Portland, Ore.—I am sending herewith drawings of a design of combination writing desk and bookcase in the "Mission" style which I hope may be of interest to "C. H. B.," Kingston, Pa., whose request for an article of this nature appeared in the March issue of this paper. The design is simple to construct and yet gives a pleasing and convenient piece of furniture.

Coping and Coping Saws

From J. C. T., Louisville, Ky.—There are some nice things about carpentry which furnish excellent oppor-

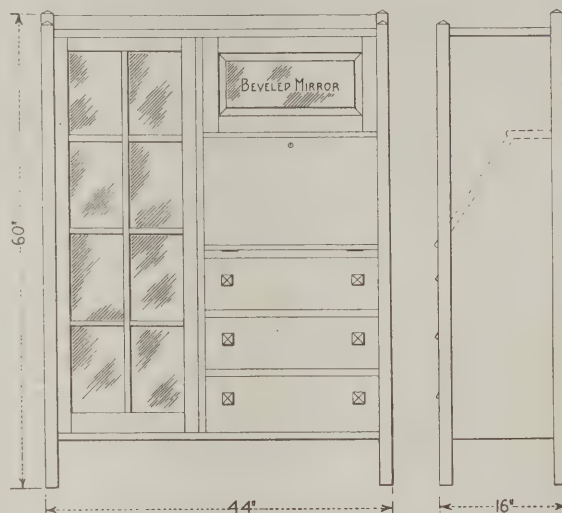


Fig. 1—Front and End Elevations of Bookcase and Writing Desk submitted by E. H. Crussell

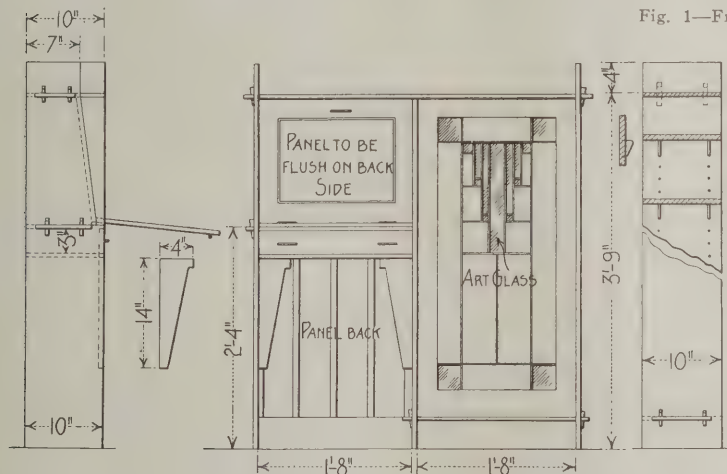


Fig. 2—Front Elevations and Sections of Writing Desk and Bookcase, submitted by "A. A. T."

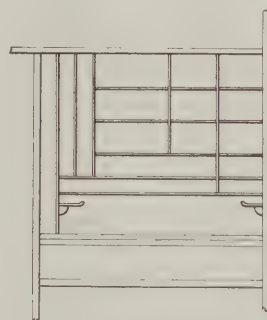


Fig. 3—Showing Interior of Desk illustrated in Fig. 2

Combination Bookcase and Writing Desk—Styles Described by Two Correspondents

doors to light the barn floor; and one window in each gable to afford a little light throughout the barn. For ventilation we use a modified form of the King system, which offers complete ventilation without any of the ill results of the louvre windows.

Combination Bookcase and Writing Desk

From E. H. Crussell, Sacramento.—In reply to "C. H. B.," Kingston, Pa., whose letter appeared in the March issue of the paper, I am sending sketches showing front and end elevations of a combination bookcase and writing desk in the "Mission" style, hoping the matter will be of use to him.

The principal dimensions are marked on the drawings and the latter are made to scale so that the sizes

tunities for the development of his skill but of which the average workman is very apt to fight shy. One of these is the miter joint and another to which, however, only comparatively few carpenters take kindly, is coping. There are some too, who fail to connect one with the other and who understand that by first cutting a miter is the way to obtain the pattern for coping.

Heretofore, in putting the base boards in the various rooms of a house it was customary to make not only the lap joints in a string piece but the corner joints as well by mitering. This too, was the case whether the base was plain or molded. The general practice at the present day is to make the inner corner joints by coping and miter only the laps in a string piece and the corners that point outward where it is essential to miter in order to obtain a good joint.

It is at times amusing to observe a carpenter who professes to have thoroughly learned his trade laboriously whittling out a pattern for coping so as to fit the molding—either base board or picture molding—when really all that he has to do to get his pattern on each piece is to miter it, allowing the point of the miter to run in on the molded part and when he cuts it off at a miter he can take the coping saw and follow the upper corner of the cut made in mitering and he has his cope. It matters not whether it is base, picture molding or what may be the form or shape of stock, he can always get his pattern for the cope by using a miter box.

In the estimation of the writer coping is a pleasure to a workman who takes kindly to it, providing he has a decent coping saw. There are coping saws at present on the market which one can buy—frame and a dozen blades—for 25 cents, but many of these are simply a nuisance. It is economy to pay more money and obtain a respectable blade. They are all cheap enough and for 50 cents one may purchase a coping saw frame and a half dozen coping blades that will serve an excellent purpose. It is seldom worth while to buy a coping blade that costs less than 10 cents and it is perhaps better to pay 25 cents for one.

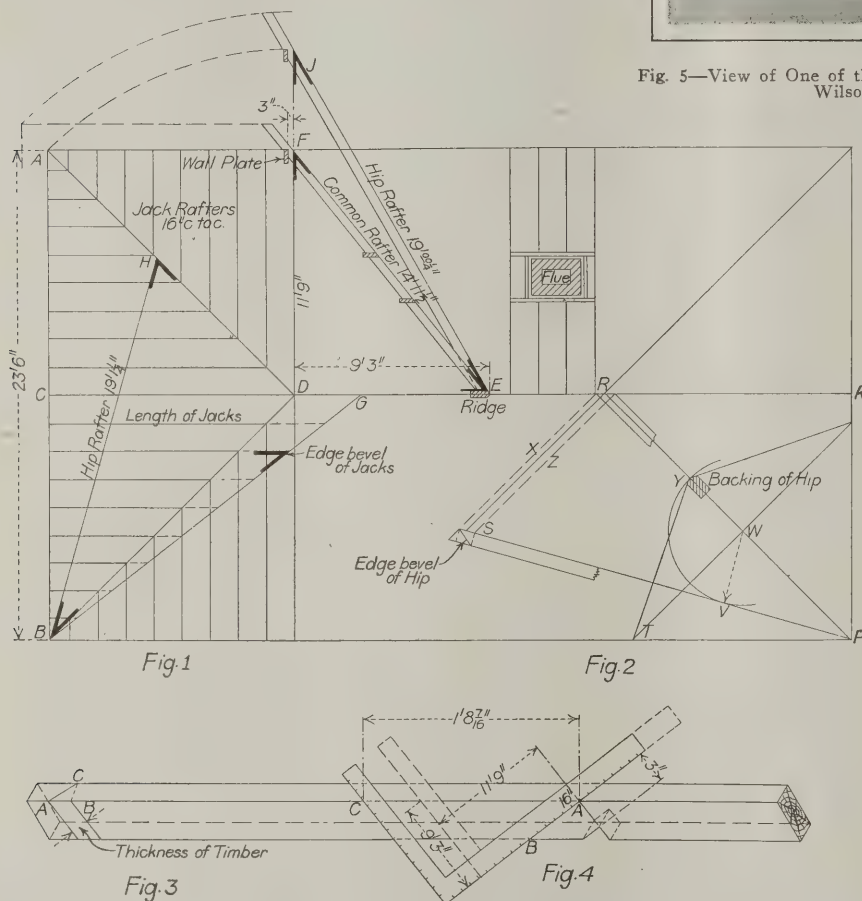
By using a good blade a workman will save enough over the time it takes fooling with one of the cheap

Graphic Method of Framing Hip Roofs Which Are of Equal Pitch

From George H. Wilson, Denver, Col.—In reply to "F. S.," Grand Rapids, Mich., whose inquiry appeared in a recent issue of the paper, I herewith submit a simple graphic method for constructing a hip roof of equal pitch. I would suggest to the correspondent that in laying out a working drawing for a roof it be made to a scale of not less than $\frac{3}{4}$ in., or better still, 1 in. to the foot. This method I have used for over 20 years on many buildings and it is absolutely correct.



Fig. 5—View of One of the Model Houses Built by Members of Mr. Wilson's Class in Carpentry



Figs. 1, 2, 3 and 4—Diagrams Illustrating the Method of Mr. Wilson

Graphic Method of Framing Hip Roofs Which are of Equal Pitch

sort to more than pay for a half dozen good ones. So, brother chips, don't try and play cheap on coping saws. When you start on a job of either coping or of mitering see that your tools are in good order and make the right kind of a job out of it. Then and only then will you get satisfaction and pleasure out of the work. It is the fellow who does not use proper tools or take enough pains to do a good job who generally finds the work of coping difficult.

The photographs of one of the model houses which is being built for practice work by the senior class in carpentry of the Denver School of Trades under my instruction, show an excellent example of what can be done by this simple method of cutting rafters for a complicated roof. I may add that each student selects the pitch of the roof in degrees for his own building, so that no two are alike and in this way each develops his own work.

The picture on opposite page showing a student standing alongside his house is intended to indicate the proportionate sizes, although primarily it is to indicate the roof framing which is done entirely by the student. The other photograph is another view of the same house.

The graphic method to find the length of all rafters and bevels required for the construction of an ordinary hip roof of equal pitch on ends and sides of any degree of pitch is as follows:

Fig. 1 of the accompanying diagrams represents one end or two corners of a hip roof with rafters placed 16 in. on centers. The width to the outside of the wall plates is shown to be 23 ft. 6 in.; the rise 9 ft. 3 in. plus 3 in. for the depth of the rafter at the wall plate. This rise is taken at random and means no special pitch.

The plan of hip rafters should be placed at an angle of 45 degrees; that is, C-D is the same length as F-D—half the width of the building. Draw a line through

the center of the building for the ridge and common rafter on each end.

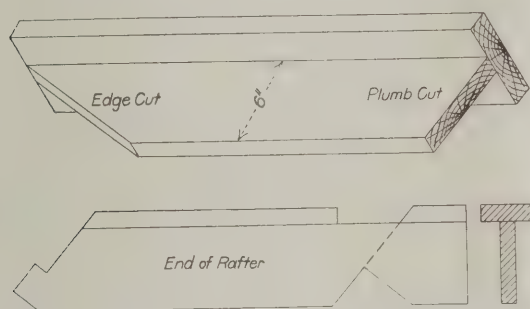
To find the length of the common rafter commence with the line $F-D$ as a base; measure off along the center line the rise 9 ft. 3 in. from D and mark E . Next draw a line from F to E , which gives the length to the center of the ridge board; also gives the plumb cut against the ridge, the plumb cut for the jacks and the cut for the seat of the rafters on the wall plate; or use the steel square 11 ft. 9 in. run by 9 ft. 3 in. rise along the upper edge of the timber.

To find the length and bevels of hip and valley rafters proceed as follows:

Measure along the center line from C the length of the common rafter to G . Draw a line from B to G , which gives the length to the center of the ridge. This is called the stretchout of common and hip rafters. Another way is also here shown, $A-D$ and $B-D$ being the plan or seat of hip rafters. Measure along the plan of the hip from D the rise 9 ft. 3 in. to H . Draw a line from B to H , which gives the length, also bevels for plumb cut and seat cut for wall plate.

Still another method: describe an arc of a circle with center at D , making $A-D$ the radius. Draw to J and $D-J$ will be the base or plan of the hip. Draw a line from E to J , which gives the length and also gives the projection of the rafter end for the cornice. For the edge bevel see Figs. 2 and 3.

In Fig. 2 is shown the method of obtaining the backing and edge bevel of hip rafters. Draw the line $P-R$, which is the plan of the hip. At right angles from this at R draw the rise 9 ft. 3 in. to S . Then draw the line from P to S , which is again the hip



Graphic Method of Framing Hip Roofs of Equal Pitch—Fig. 6—Templates for Bevels

rafter. Draw the line $T-K$ at right angles on both sides of the hip and this may be of any length, but must be equal on both sides from P . Draw the circle with W as center tangent with the line $P-S$ at V , cutting the line $P-R$ at Y . Draw the lines $K-Y$ and $T-Y$, which give the bevels. Reversing the bevel will give the cut for the valleys.

For the edge bevel for hip rafter make a plan of the rafter on $P-R$ of any convenient thickness and draw the dotted lines $X-Z$ for the apex. On the outside of the line $P-S$ show the edge of the hip the same thickness as on the plan. Square over from this to $X-Z$ and draw the diagonal, which gives the edge bevel.

To find a length of the edge bevel of the jack rafters proceed as follows:

Extend the jack rafters indicated by the dotted lines from the plan of the hip to the line $B-G$. Fig. 1, which is the stretchout or length of the hip rafter, gives the length of each jack to the center of the hip. This also gives the correct edge bevel.

I recommend this method of obtaining the lengths of jacks for the reason that frequently a dormer is located upon the end of a hip roof and the double rafters upon which a dormer is built can be accurately located and its length obtained separately without having to intersect with a jack on opposite side of hip, if they

should be placed at fixed centers to receive the lath.

Another accurate method to obtain the edge bevel for jacks and hip rafters is shown in Fig. 3 of the

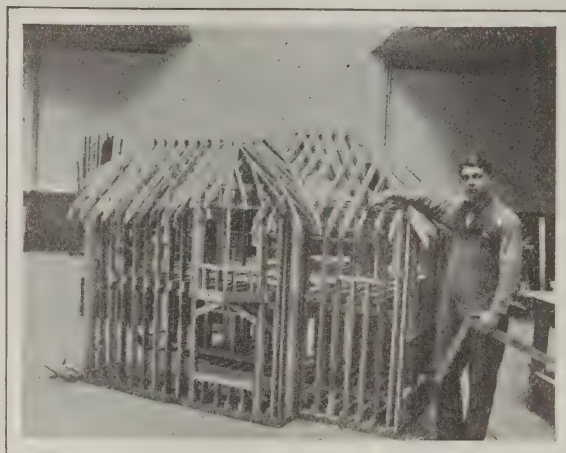


Fig. 7—Another View of the Model House Shown in Fig. 5 of the Illustrations

sketches. Mark on the side of the timber the plumb cut A , then measure the thickness of the timber square from this line. Draw the line B square across the edge from B to C . Draw a line from A to C , which gives the correct bevel. This rule applies to any pitch of roof and is simply a cut of 45 degrees on the plan.

Fig. 4 shows a simple and correct method to obtain the difference in the lengths of jack rafters. Lay the steel square on the timber; the run 11 ft. 9 in. on the blade and the rise 9 ft. 3 in. on the tongue. Draw a line on the blade $A-B$, then move the square forward on the base line $A-B$ to 16 in.—the spacing of the rafters—and mark the edge of the timber on the tongue at C . The hypotenuse from A to C will be the difference in length of each jack—1 ft. 8 7/16 in.

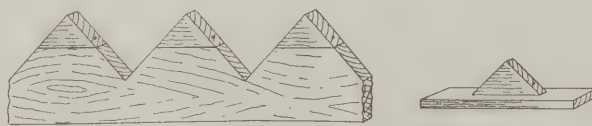
Lay out all jacks on the common rafter, commencing at the top. First take off half the thickness of the hip; then make each 1 ft. 8 7/16 in. shorter.

This rule applies to any pitch of roof. Use the run and the rise and move the square along the line of run to the distance apart the rafters are to be placed.

In Fig. 6 are shown sketches of two templates which I always make for bevels before starting to cut a roof, as they are far more reliable and much handier than the loose blade bevel. Even a casual glance at them will readily show their value to the practical reader.

Special Material for Stair Carriages

From L. H. B., Bloomfield, Ind.—It often happens in small or medium priced houses that no special material is provided for stair horses and in some of the work which I was called upon to execute I overcame the difficulty by using 2 x 8 in. material in the manner indicated in Fig. 1 of the accompanying sketches. To lay out the stair carriage I first applied my square to a



Special Material for Stair Carriages—Figs. 1 and 2 Showing How to Cut the Material

line with the rise on the tongue and the run on the blade which gave me the length of one step and rise on the carriage. I then bisected the tread and laid out my pitch block of 1 in. stuff. Next I cut a piece of 1 x 3 in. stuff the exact length of one step and rise on the

carriage and nailed the pitch block to it as shown in Fig. 2 of the sketches. I then applied this to the 2 x 8; marked the block and the end of the 1 x 3. To space the notches I slipped forward the length of the 1 x 3 and marked again, repeating this operation until the carriage was completely laid out.

If the job is carefully done the pieces cut out will just finish out the carriage, while saving half the sawing and makes a 2 x 8 take the place of a 2 x 11 in. piece.

Constructing a Drawing Table and Board

From T. L. S., Pittsburgh, Pa.—In view of the contributions from various readers of the paper relative to the construction of a drawing board and table the following particulars and accompanying sketches may not be without interest.

Most architects and designers are in favor of advancement and betterment in building progress, yet their local office conditions are in many instances somewhat crude. The drawing table and appliances are frequently items which are given little if any attention and of the many designs which have come under my observation the one shown in Fig. 1, was finally developed as entirely satisfactory for the pur-

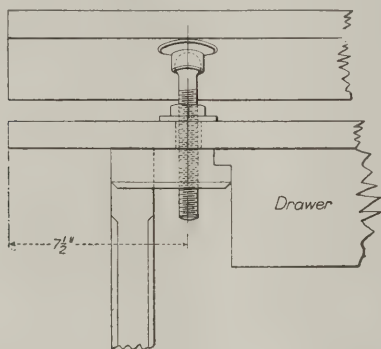


Fig. 2—Rear View Showing Adjusting Screw—Scale 1 1/2 in. to the Foot

The drawing board is 38 x 60 in. and will accommodate large tracings and drawings to good advantage. The drawer shown in the side elevation, Fig. 1, is 20 x 33 in. over all, and constitutes a feature worthy of comment, as it has ample room to accommodate the usual books and data used by a designer or draftsman. The drawer is set to the right side, thus allowing a man to be seated on a stool at the left when using the T square and also allows the connecting beam 1 3/4 in. by 4 ft. 8 in. by 5 in. to be used as a foot rest.

The following bill of materials may not be without interest in this connection:

4	1 3/4 x 4 1/2 x 48	in. pieces white pine legs.
1	1 3/4 x 5 x 72	in. piece white pine connecting piece.
2	1 3/4 x 5 x 33	in. pieces battens.
1	1 3/4 x 4 1/2 x 33	in. piece drawer slide.
2	1 7/8 x 3 1/2 x 36	in. pieces edges for table top.
4	1 7/8 x 9 x 64 1/2	in. pieces tongued on end for top material for 1 drawer.

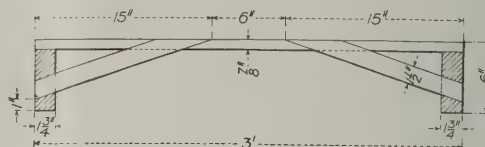


Fig. 4—Side View of Footstool for Draughtsman—Scale 3/4 in. to the Foot

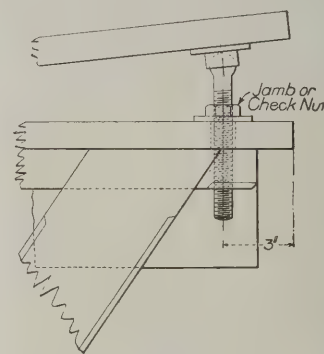


Fig. 3—Side View Showing Adjusting Screw—Scale 1 1/2 in. to the Foot

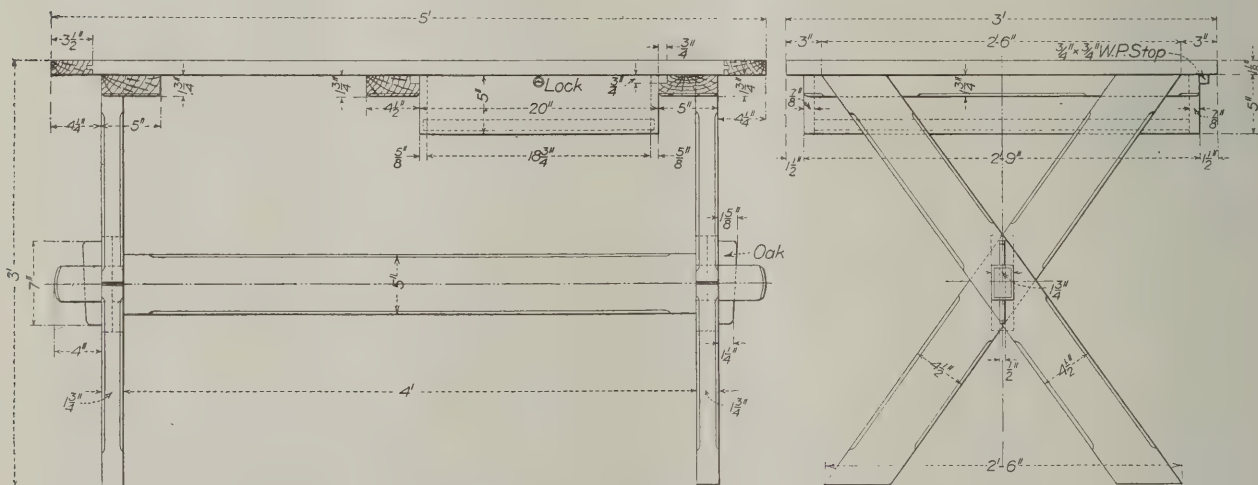


Fig. 1—Side and End Views of the Drawing Table—Scale 3/4 in. to the Foot

Constructing a Drawing Table and Board, as Suggested by "T. L. S." of Pittsburg

pose. I have been working on a board of this type for something like two years and it has met all conditions.

The table can be used until the top is in bad condition, when a board can be attached by means of the adjusting screws clearly indicated in Figs. 2 and 3 of the sketches. These provide the means for lowering or raising the board to any angle desired and at the same time they enable the board to be held in position by means of the ball arrangement.

For a man small in stature the foot stool shown in Fig. 4 can be used, although this is not necessary for the man of average height.

The table may be made of well seasoned white pine and shellacked or varnished.

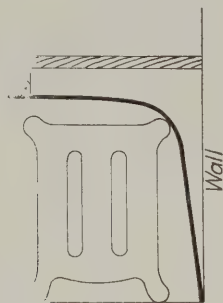
Architects Should Understand Mill Details

From W. M. L., Orange, N. J.—Referring to the article entitled "Architects Should Understand Mill Details," presented on page 295 of *The Building Age*, I would suggest that architects and draftsmen would doubtless appreciate it if the author of that article, John Wavrek, Jr., would show a list of sizes of timber in the rough and dressed. When such tables are

conveniently at hand no time is lost to the draftsmen not familiar with mill work sizes; in other words, a table would be invaluable.

Building Window Seat Over Radiators

From A. B., Winnipeg, Canada.—I would say to "O. R. M. G.," Chicago, Ill., that he can build his window



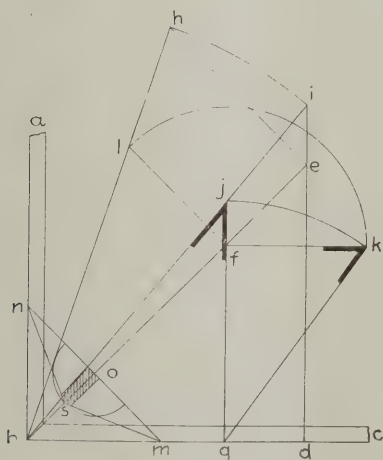
Building Window Seat Over Radiators

seat in the manner indicated in the sketch which I enclose and it will not affect the radiation in the least. All he needs to do is to nail a sheet of iron on the under side of the seat, extending it down nearly to the floor line and running the full length of the seat. It should be fastened as indicated to throw the heat out from under the seat. There is no necessity of spoiling the seat by boring holes in it. Radiators can be obtained ranging in height from 14 in. upward.

From P. M. H., Sedalia, Mo.—I would say to "O. R. M. G.," Chicago, Ill., that he can make a grating or grille work out of $\frac{7}{8} \times \frac{1}{2}$ -in. stuff for use in front of the seat and extending the entire length of the opening. My plan is to make the $\frac{7}{8} \times \frac{1}{2}$ -in. strips out of the same kind of material as the finish of the room, although personally I prefer oak. I place the strips $1\frac{1}{2}$ in. apart.

Finding Lengths and Bevels of Hip and Jack Rafters

From C. J. M., St. Johns, Newfoundland.—The accompanying diagram and descriptive particulars are sent for the benefit of "F. S.," Grand Rapids, Mich.,



Finding Lengths and Bevels of Hip and Jack Rafters—Method Suggested by "C. J. M."

and others who may be interested. The lines $a-b$ and $b-c$ in the diagram Fig. 1 represent the walls at the angle of a building; $b-e$ is the seat of the hip rafter and $g-f$ is the seat of the jack rafter.

Draw $e-h$ at right angles to $b-e$ and make it equal to the rise of the roof. Join b and h and the line $h-b$ will be the length of the hip rafter.

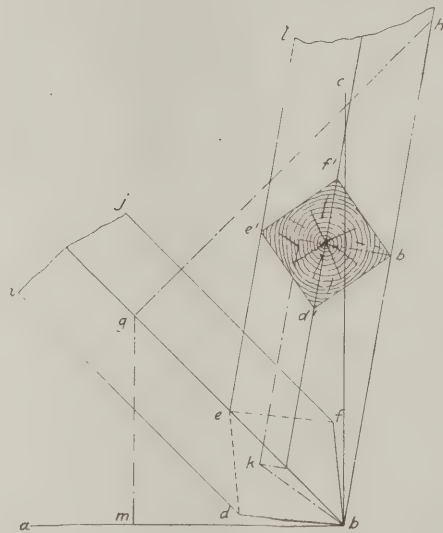
Through e draw $d-i$ at right angles to $b-c$. Upon b with radius $b-h$ describe the arc $h-i$, cutting $d-i$ in i . Join $b-i$ and extend $g-f$ to meet $b-i$ in the point j . Then $g-j$ will be the length of the jack rafter. The length of each jack rafter is found in the same manner by extending its seat line to cut $b-i$.

From f draw $f-k$ at right angles to $f-g$; also $f-l$ at right angles to $b-e$. Make $f-k$ equal to $f-l$ by the arc $l-k$ or make it equal to $g-j$ by the arc $j-k$. Then the angle at j will be the top bevel of the jack rafters and the one at k will be the plumb cut.

To find the backing of the hip rafter proceed as follows. At any convenient place in $b-e$, as for example o , draw $m-n$ at right angles to $b-e$. From o describe a circle tangent to $b-h$ cutting $b-e$ in the point s . Join $m-s$ and $n-s$. Then these lines will form at s the proper angle for the beveling of the top of the hip rafter.

Framing a Tower

From W. S. W., Pleasant Ridge, Ohio.—In running over the March issue of the paper I noticed on page 143 a "Question in Framing" from "J. F. M.," Los



Framing a Tower as Suggested by "W. S. W."

Angeles, Cal. I do not quite understand just what he means, but I suppose he wants to set a large post on each corner with a run of 6 in. to the foot both ways, which would be a run of about $8\frac{1}{2}$ in. to the foot post as shown in the accompanying sketch, wherein a, b, c is a plan of one corner, d, i, j, f, b is the post in plan, b, e, l, h is the elevation of the post and d', e', f', b' is a cross section of it. The distance m, g is just half of g, h , which would make the run straight in a pitch of 6 in. to the foot.

The run of the post is from b to g , while g, h is the rise and d, e, f, b is the shape of the end of the post after it is sawed off. The true bevel across one of the sides as at k, b, k . All sides will cut with same bevel.

If this is not the way "J. F. M." wants the post to set he will have to come again. It is hard to tell just how it is to be built from what he says in his letter. I do not understand what he means by the side cut.

What Readers Say of "The Building Age"

From C. H. S., Painesville, Ohio.—I, like "W. A. B.," of Todd, Okla., have been a subscriber since the early days of the paper. I have bound in my library the first eight volumes of *Carpentry and Building*, and but for an over-zealous housemaid who burned them before I had them bound, would have been in possession

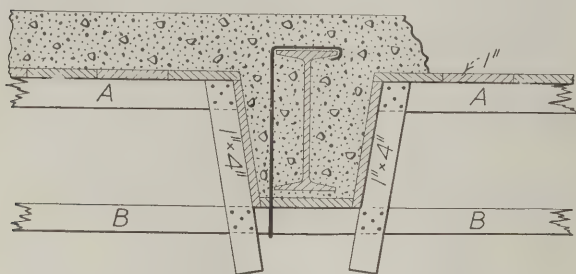
of the following four volumes. I then stopped taking the paper for a time, but feel that I shall now take *The Building Age* as long as I continue in the building business.

I wish that every young carpenter in the United States would take it and study it, for it would make better carpenters of them all, as it is surely the best trade paper of which I have any knowledge.

From William F. Puffert, Architectural Designer and Superintendent, Calgary, Alta.—I want to say in renewing my subscription to the paper that I consider *The Building Age* the most important part of my library. If every man in the building line would carefully study *The Building Age* he would be a better mechanic and therefore entitled to bigger wages. *The Building Age* has done this for me.

Supporting "Forms" for Concrete Beams

From A. H. B., Winnipeg, Canada.—There appeared in the March issue of the paper an inquiry from "R. T. W.," Montreal, relative to a method of supporting



Supporting "Forms" for Concrete Beams

the "forms" for concrete beams. I am sending a sketch which may be of interest to the correspondent in question. The stirrup made in the shape indicated is just wide enough to take a 2 x 4. It can be made on the job, usually, of a 1/4-in. or 5/16-in. round iron, bent in a vise, and with the ends square, and these are then turned under the flange of the I-beam with a hammer. They are placed 2 ft. on centers along the beam and 2 x 4's are nailed in the position shown by A A to form the slab. At B is shown one of the 2 x 4's which run through the stirrups from beam to beam. The "forms" of the slab are then fixed in the manner indicated. The 1 x 4-in. cleats are nailed to the two x 4's as shown in order to elevate the slab forms to the required height.

Cause of Discoloration of Plaster

From G. A. C., Franklin, La.—Referring to the query of "J. L. H.," Warwick, N. Y., which appeared in the May number of the paper I would say that the bark on the laths, impurities in the plaster, unclean tools, etc., may sometimes cause a little trouble of this kind. Some woods, like cypress for instance, might cause staining after the lapse of time. Soot often will cause brown streaks in whitewash as well as the use of water which has come into contact with decayed vegetation.

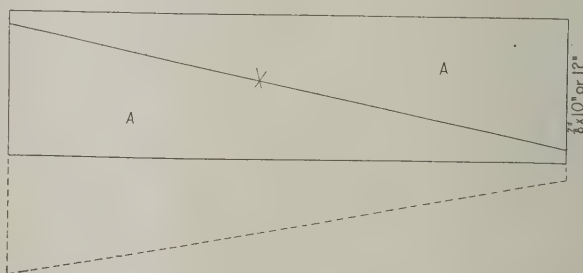
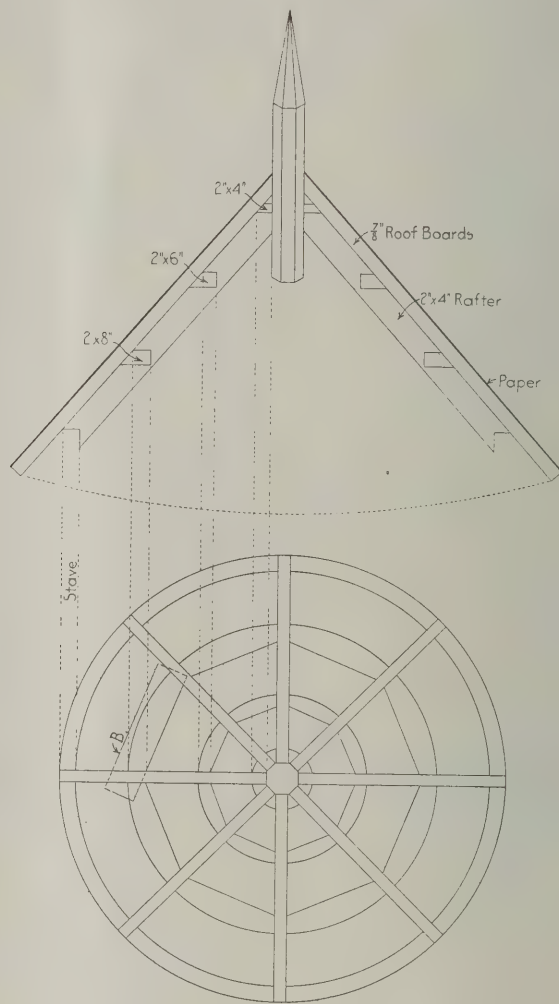
I have little doubt that the yellow stains on plaster mentioned by the correspondent are due to the workmen urinating on the surfaces to be plastered, such as the lath, first coats, or even in the mortar bed—anywhere that the urine may come into contact with the plaster. I had a lot of trouble on one job in the same way, but after "firing" one hod carrier who had the "habit" the trouble was at an end.

In the case under consideration, however, I judge that the stains appear within a few days of the time the plaster was applied and the cause I have men-

tioned will bring it about very promptly. Possibly the correspondent has observed the yellowness of whitewash in an outhouse or stable. I do not know just what the active agent in the excretions is and of course it is possible that this agent might get into the plaster from some other source.

A Cheap Silo Roof

From Worker, Poughkeepsie, N. Y.—I am sending the accompanying sketches in the hope that they will help "R. L.," Brookville, Ind., who recently inquired regarding the construction of a round silo roof. Lay out on the floor a circle equal in diameter to the silo to be roofed and space in eight equal parts for the



A Cheap Silo Roof—Plan and Elevation with Pattern of the Roof Boards

rafters, as shown on the accompanying plan. After taking half the thickness of the finial off the rafter, space in three equal parts for the tie beams. The latter are laid out as shown at "B" and beveled to the pitch of the roof which should be 8 in. or 10 in. to the foot.

Make the tie beam marks on the rafter square with the pitch of the roof. The diagram shows the pattern

of the roof boards, while the elevation gives an idea of the construction of the roof.

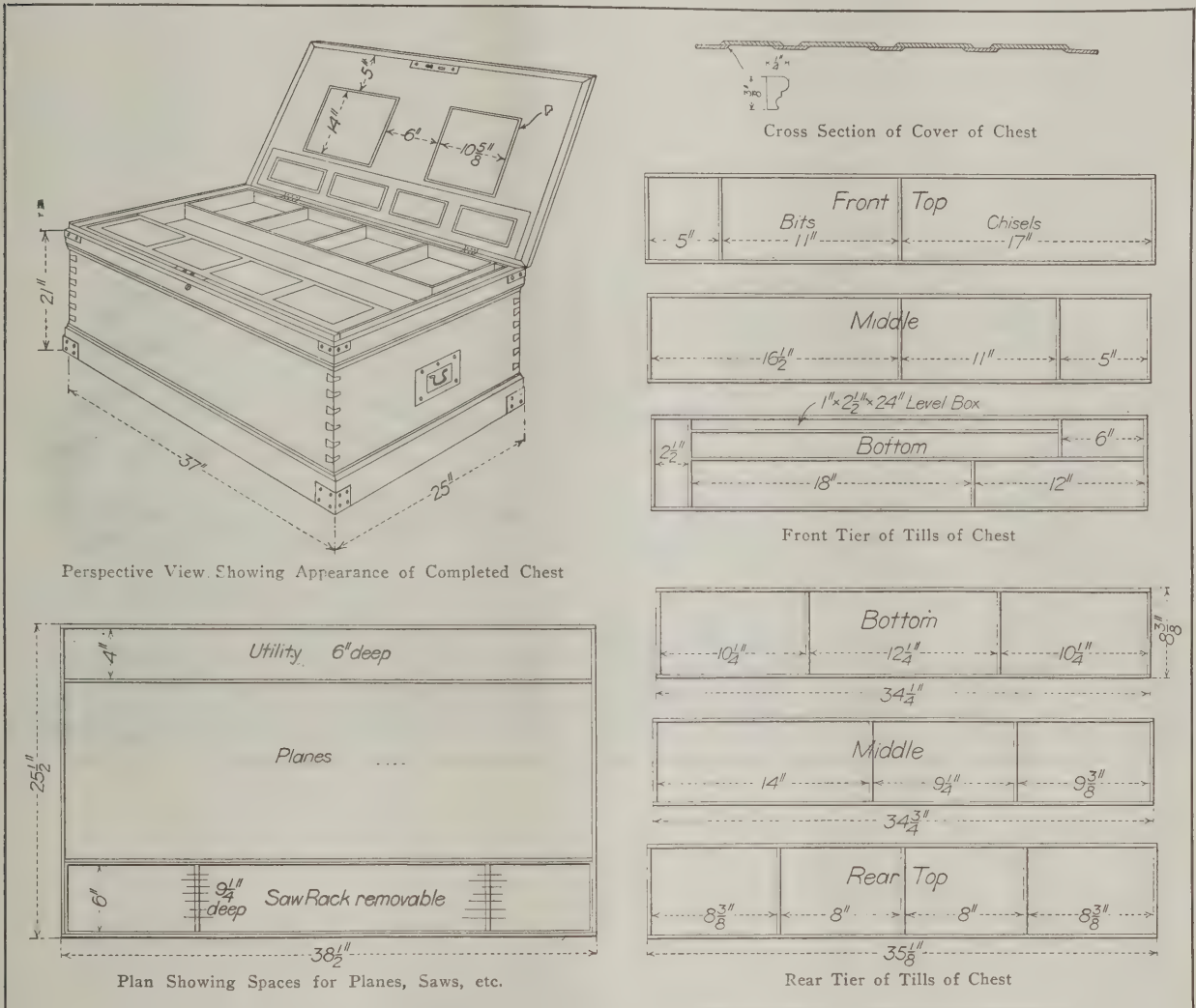
Construction of a Carpenter's Tool Chest

From D. P. Barry, Redford, N. Y.—I am sending sketches of my tool chest which with the accompanying comments may not be without interest to the correspondent making inquiry a short time ago for a chest of this nature. My tool chest is built entirely of black walnut. The tills are of $\frac{1}{2}$ -in. material and slide on rabbets formed on the ends of the chest. The tills are $2\frac{1}{2}$ in. deep inside and 3 in. with bottom. The steel square is fastened on the cover with little

cellars where ordinary drainage is impracticable is to set a barrel, box or concrete basin below the level of the cellar and drain the floor toward it. A cellar drainer should be installed and operated by a water service similar to a steam jet pump. These are obtainable both automatic and otherwise. Those which are not automatic being very inexpensive.

If there is ground water the correspondent before laying the concrete floor should dig a few channels leading to the pit or sump and bore or construct a few holes of moderate size into the sump from these channels, the channels being filled with broken stone or coarse gravel.

If there is no water service construct the sump and



Construction of a Carpenter's Tool Chest—By D. P. Barry

buttons. The two top tills have paneled covers. The chest cover is also paneled, all being raised, as shown in the cross section.

Some of the divisions have false removable bottoms, making them two stories, while others have little boxes sitting on triangular corner posts, all removable for small bits, screwdriver bits, etc. The level box is for a "Stanley" ground glass level.

The corners of the tool chest are bound with 12 brass corner pieces, an idea of which may be gained from the perspective view.

Draining a Cellar

From G. A. C., Franklin, La.—Referring to the inquiry of "O. W.," Marion, Ind., which appeared in the May issue of the paper, I would say the best simple arrangement I have observed for very wet and low

then buy a galvanized iron pail and use it ad libitum mixed with plenty of elbow grease.

Some Words of Commendation

From D. P. B., Redford, N. Y.—I notice in the June issue of the paper a number of answers to the inquiry of "F. S.," Grand Rapids, Mich., who asked how to find the lengths and bevels of hip and jack rafters. I wish to commend James Barry on the simplicity of his drawing. It is better to make two or three diagrams than to overburden one with confusing lines. The every-day carpenter will study out his explanation. The diagram of J. T. Brown is also good, but I regard the others as too complex for one cut. My advice is "help the plain mechanic."

I want to thank "J. J. W." for his "wrinkle" with the hand saw. I have been in that sort of pinch myself.

English Cottages of Concrete for Workingmen

An interesting building operation involving the erection of a number of workingmen's cottages of concrete blocks has recently been conducted at Talbot's Inch, Kilkenny, Ireland, and in the half-tone illustration presented herewith we show housing accommodations for six families. In view of the attention which is being given at the present time to homes for the working classes in this country the operation is of more than passing interest.

The plans provide an economical arrangement of rooms, the feature being a large living room and a good-sized "scullery," as the English term the kitchen arrangement. There are three bedrooms—a quite necessary accommodation where there is a large family and which is too often overlooked in the housing of the working classes. The fireplaces are grouped in

owners, real estate men, doctors, lawyers and even capitalists, read the advertisements in our journal. They wouldn't be "live wires" if they didn't, and by live wires we mean successful professional and business men. A man must read the advertisements nowadays if he wishes to keep abreast of the times. New devices continually are being perfected and new methods are being followed. They may mean economy for the owner, greater efficiency for the builder and added glory to the architect.

But how many who read the advertisements and profit by them think to say *WHERE* they read them!

You, Mr. Architect, want to know who sent you your newest client, or you, Mr. Contractor, who stood sponsor for your ability. Equally true our advertisers want to know, and are entitled to the information, where *you* heard about *THEM*.

So next time you write, 'phone or call upon these



English Cottages of Concrete for Workingmen—View of a Dwelling Having Accommodations for Six Families

such a way that one set of chimney stacks serves two houses.

The arrangement of the large dormer windows, the contrast afforded by the rock-faced "Winget" blocks, and the "rough-cast" effects of the first story with the red fibro-cement shingles combine to give the exterior a rather striking appearance. All of the cottages were erected with concrete blocks of the character indicated, as were also the partition slabs for internal walls and the gate posts in front of the cottages.

The architect of the buildings, of which an example is here illustrated, was F. W. Kiddie of Talbot's Inch, County of Kilkenny, Ireland.

firms you are helping to maintain this journal that is working in your interests—don't forget to tell them "I saw it in *The Building Age*."

Through the acceptance of the wage proposition offered by the Master Carpenters of Philadelphia a 5 cent increase will go into effect on September 1 of the present year, this bringing the scale of wages up to 55 cents per hour. The scale will remain in effect until January 1, 1915, when the wage will be increased to 57½ cents, and on June 1, 1916, the rate will be increased to 60 cents.

Tell the Advertiser Where You Saw His Card

Mr. Building Contractor, when an architect asks you to figure on a job of work if you have never figured for him before and never asked him for that privilege would it be anything more than human for you to wonder who recommended you to him?

Mr. Architect, when a new client comes to you unsolicited, very naturally one of the first things you want to know is who sent him.

Now, we know that both architect and builder as well as a lot of other people, including prospective

The differences between the members of the Master Builders' Association and the carpenters of Erie, Pa., have been adjusted by the men accepting a proposition for an increase of 2½ cents per hour and a nine-hour day.

City Councilman H. H. Hammer of Red Bluff, Cal., claims to have the only absolutely fireproof home in northern California. It is built of concrete blocks, with steel shingles and a floor of "fibrestone," a fire and waterproof compound. All the lighting, heating and cooking is done by electricity.

CONCLUSIVENESS OF ARCHITECT'S DECISION

Persons Bound by Certificate—Effect of Fraud or Mistake— Right to Withdraw Certificate

BY A. L. H. STREET



PROVISION in building contracts to the effect that the certificate of a supervising architect that the contractor has fully performed his work, or decision by the architect upon a matter in dispute between the owner and the builder shall be final and conclusive are uniformly sustained by the courts, subject to the limitations noted below. This binding effect of a certificate or decision extends to the owner, the builder and any other parties to the contract, including the surety on the contractor's bond given to secure performance of the work as agreed. But, as between either party and the architect, the certificate or decision is not generally conclusive.

It may be broadly stated to be the law that fraud of the architect or such gross mistake as warrants an inference of bad faith or failure to exercise honest judgment affords the only ground upon which his decision or certificate can be impeached, except as noted below.

Ground Upon Which Decision Can be Questioned

Another important limitation upon the conclusiveness of the engineer's judgment lies in the rule that his decision or certificate is final and binding only as to matters within the scope of his duties and the building contract under which his services are rendered. From many reported cases involving questions as to the scope of the architect's power in this respect, the writer presents the following examples: Decision that the contractor was not liable for extra expense for excavation made necessary by encountering quicksand in making excavations has been held to have been conclusive upon the parties. (*Norcross vs. Wyman*, 72 *Northeastern Reporter* 347.) In a Pennsylvania case (33 *Atlantic Reporter* 71) a clause referring to a supervising architect "all disputes as to the tenor and intention of the drawings and specifications, or of the contract," was held to embrace a controversy on the point whether the builder and his sureties were bound to refund to the owner an amount paid to discharge a mechanic's lien. On the other hand, a similar stipulation was declared not to make conclusive a decision of the architect on a claim by the owner for merchandise sold to the builder as part of an independent transaction; and an Illinois decision holds that provision that an architect's decision should be final on any disagreement between the parties relating to the performance of any agreement contained in the building contract, did not cover a claim of the builder for damages sustained by him through being delayed by other contractors' failure to complete their part of the work.

Claim for Damages by Owner

In a lawsuit which arose in Chicago, the Illinois Appellate Court decided that a clause making an architect's decision conclusive "as to the interpretation of the drawings and specifications, and as to the quality or quantity of work on materials, or any other matter connected with the work, furnishing materials, or in settlement of this contract," did not include a claim by the owner for damages resulting from unreasonable

delay of the builder in completing the work. In still another case, the Michigan Supreme Court has held that power given an architect to determine all questions as to the meaning of the plans and specifications, did not authorize him to decide a disputed method of measuring brick used in walls. (*Walker vs. Syms*, 76 *Northwestern Reporter* 320.) Provision in a contract to construct a school house that the city's superintendent of buildings should be the final arbiter of questions relating to the execution of the contract, made conclusive his finding that the work was not progressing according to the contract, and that the city was justified in taking possession of the unfinished work. (*Jones vs. City of New York*, 65 *New York Supplement* 747.) A government building contract requiring the contractor to furnish "sandstone of quality approved by the engineer," makes the engineer's decision binding upon the government as well as the contractor. (*United States vs. Barlow*, 22 *Supreme Court Reporter* 468.) In a South Dakota case, it was decided that under a contract providing that the value of any alterations shall be appraised by the architect, his appraisal was conclusive upon the parties in the absence of fraud or collusion. (*Seim vs. Kruse*, 83 *Northwestern Reporter* 583.)

Owner Showing Work Not Completed

A clause in a building contract making the architect's certificate of completion a condition precedent to the owner's liability for the final payment, but not making the certificate binding upon the parties, does not prevent the owner from showing that the work has not been completed, notwithstanding issuance of such certificate. (*Gallagher vs. Minturn*, 50 *New York Supplement* 491.) Under another contract requiring "that the materials to be furnished shall be of the best quality, and the workmanship performed in the best manner, subject to the acceptance or rejection of Edward Wall, architect, and all to be in strict accordance with the plans and specifications," it has been decided by the New York Court of Appeals that the provision for approval or rejection by the architect was merely an additional safeguard against defects not ascertainable by an unskilled person, and that the approval of the architect did not bind the owner to pay for inferior materials or workmanship.

Under a contract to construct a house "to the satisfaction of the architect," his certificate of acceptance is not conclusive as to latent defects, such as the use of varnish inferior to that contracted for, if the architect was absent while the varnishing was being done, and the inferiority of the work could be detected only on lapse of time. (*Spink vs. Mueller*, 77 *Missouri Court of Appeals Reports* 85.) But in a Wisconsin case, *McAlpine vs. Trustees*, 78 *Northwestern Reporter* 173, it was decided under a clause making the architect's certificate conclusive as to materials and quality of work, that his certificate of full completion of the contract work precluded any subsequent claim by the owner on account of defects in heating apparatus thereafter discovered; there being nothing to show mistake or want of good faith on the architect's part.

In discussing the rule as to what constitutes fraud which will vitiate an architect's decision, the Illinois

Supreme Court has said: "Fraud cannot be presumed merely because his estimates for work done pursuant to the terms of the contract are less than the measurement of the quantity actually done. Even if he, by mistake in judgment, erred in condemning or rejecting work it would be no ground to impeach his estimate. To prove that the estimate is fraudulent, it is not sufficient merely to show that work was rejected or condemned which in the opinion of others should not have been rejected or condemned. It may, indeed, be proved as a circumstance tending in some degree to establish fraud, but is not conclusive. The evidence must show that the engineer knowingly and wilfully disregarded his duty, and rejected or condemned work which he knew, or at least should have known, fully conformed in all respects to the terms of the contract."

The general rule that where an architect has issued a certificate showing performance of contract work to his satisfaction, he may not subsequently withdraw or qualify it, is sustained by decisions of New York, Vermont and Illinois courts. In a New York case, it was decided that binding effect of a final certificate was not weakened by the architect writing a letter after the certificate was issued, stating that the certificate was not intended to conclude any just rebate or offsets. (47 New York Superior Court 1.)

Permanent Exhibition of Building Materials

A new departure in the way of permanent exhibitions of building materials in Chicago will be in operation shortly when the entire second floor of the new Insurance Exchange building, 175 W. Jackson boulevard, will be given over to this purpose. The space approximates 22,000 sq. ft.

The entire floor has been subdivided into various sizes affording excellent accommodations for exhibitors at a very moderate cost. Besides the numerous conveniences that are to be had in this modern office building, a reading room will be furnished with magazines, trade papers, periodicals and general literature relating to building supplies, city ordinances and other important information along these lines.

The management intends to reach not only architects, contractors, builders and sub-contractors but also those who are interested in the construction of buildings in Chicago and adjacent territory. The management will furnish names of reliable architects, contractors, builders and supply houses and assembly and committee rooms will be placed at the disposal of exhibitors and the various building trades associations free of charge.

Further particulars concerning space rates and floor arrangements can be secured by writing A. Friedman, manager of the Building Material Exhibit, Insurance Exchange building, Chicago, Ill.

A Mammoth Sheet Metal Statue

The mammoth statue which now crowns the municipal building of New York City, now nearing completion, stands as a tribute to the art of producing architectural ornamentation in sheet metal. This statue of the Goddess of Civic Fame is constructed on an iron framework covered with 20-oz. stamped copper. In all some 435 different sections go to make up the stamped copper work comprising the statue. These figures give an idea of the intricacy of such a problem for the stamper, which in this case was Broschart & Braun, manufacturers of architectural sheet metal ornaments, New York City.

The statue was designed by Adolph Alexander Weinman, an eminent sculptor whose name has been affiliated with the decorations of numerous public and private buildings of this and other cities.

Although the goddess is of graceful figure, she weighs a ton and has a height of 24 ft. from the base upon which she stands, to the top of the crown on her head. The ball on which her feet rest is 6 ft. in diameter. The top of the statue will be 584 ft. above the ground.

The statue has a shield emblazoned with the seal of the city of New York on the right arm and in the hand a spray of laurel. Held aloft in the left hand is a mural crown of five parapets, one for each of the five boroughs of Greater New York and at the base



Mammoth Sheet Metal Statue on the Cupola of the New York Municipal Building

of the crown a number of dolphins swim in token of the maritime importance of the city.

The architects had a cast-iron statue 22 ft. in height put in place when the building was erected so as to form an idea of the proper proportions on which to design a figure which would be pleasing to the eye from the ground far below.

One of the prominent improvements which are contemplated along upper Broadway, New York City, is a 12-story apartment house to cost about \$400,000, to be erected at the southwest corner of that thoroughfare and Seventy-Sixth street. The architects are Peabody, Wilson & Brown, 389 Fifth avenue, Manhattan. Another contemplated improvement in that zone is a 12-story apartment house in West Eighty-Fourth street, estimated to cost in the neighborhood of quarter of a million dollars.

The past few years have witnessed a steadily growing demand in South India for expanded metal lath.

FIRST BRICK HOUSE BUILT IN PHILADELPHIA

After a Lapse of Two Hundred and Thirty Years, This House of William Penn, Erected in 1682, Is Still One of Philadelphia's Homes

THE house which forms the basis of the accompanying illustration was the first brick residence erected in the city of Philadelphia, and was occupied by William Penn, during his first visit to that city. "Letitia House" as it is sometimes called, was built in 1682 on Letitia street, a small thoroughfare between Chestnut and Market and Front and Second streets, and was named for Penn's daughter, Letitia.

The house stood in the middle of the proprietary's lot which had a frontage of 402 ft. in High street and extended southward 172 ft. in Front and Second streets, halfway to Chestnut. It was originally intended as a residence for Penn and his family and its erection is said to have been commenced before his arrival in the province. The house is a very plain structure built of brick, and some writers have asserted that the bricks were brought from England, but this is considered unlikely, as very good bricks were made at the time in the immediate vicinity by Daniel Pegg, who owned the land afterwards known as the Northern Liberties.

When Penn lived in this house, he must have kept "bachelor's hall," as his wife and his daughter Letitia remained in England. In 1701, Penn conveyed the property to his daughter, from whom it afterward took

its name, The Letitia House, as has been noted above.

After undergoing many vicissitudes, it was taken down and in 1883 rebuilt, brick for brick, in Fairmount Park, Philadelphia, where it remains a memorial of the old city. The money for the removal was furnished by several prominent residents of the city. Great care was used in the demolition and the structure was rebuilt with the same materials and on the same plan as that of the original structure, at a cost of about \$5,000.

The house is two stories in height with a large garget and a small back building. The doorway is in the middle with a bracketed porch roof above it and a window on each side. The entrance opens into two rooms, one on either side of the structure. The second story front had three windows and there was a square-headed dormer window in the roof, opening into the loft. In the northern wall there were two windows in the first story, one in the second, and two under the eaves. The cornice in front under the roof was heavy and plastered and extended around the northern wall to the second story window where it was cut through for a window decoration and then continued along the rest of the wall. The eaves on the northern side were

also trimmed with a very heavy plastered cornice.

Along the northern side of the house, which looks into High street, was a road or path which led toward Second street, where the Governor's Gate was established immediately opposite the Great Meeting House. It was on a part of the ground on which the old London Coffee House was afterwards built.

In later years when the entire lot had been alienated and appropriated to other uses, the house fronted in Letitia court, which extended to High street and was subsequently cut through to Chestnut street.

Why Chinese Business Buildings Are Small.

The average Chinese shop of any kind in Tien-tsin and Peking is a one-story building without doors or windows to the street. The entire front is closed by

shutters at night; in the daytime the shutters are removed. These shops are 14 ft. to 16 ft. wide on the street, and the room is not deeper than this. Three or four feet back from the front a counter runs, behind which there is shelving.

The storerooms are not deeper, according to Samuel S. Knabenshue, Consul-General at Tien-tsin, because of the peculiar arrangement of Chinese houses. The typical

Chinese house is only one story in height, and is built on all four sides of a square courtyard. If more room is needed, there is a second courtyard in the rear with a communicating door, and so on. The yamens, or official residence, of the various Chinese officials of Tien-tsin are all erected in this way—one courtyard after another surrounded by buildings all opening into the court.

Inspection Certificates for Concrete Construction

The strength of concrete work is so entirely dependent upon the relative quantities of the ingredients used and the manner in which these materials are mixed that a form of inspectors' certificate which shall specify in detail the conditions under which such work was accomplished will be more likely to secure a conformance with the specifications. Such a form has been recently suggested by Alfred Root Fry, chief engineer and superintendent of Federal Buildings, New York City.

This form of certificate, recently incorporated in a letter to *Engineering Record*, is as follows:



The First Brick House Erected in the City of Philadelphia

I hereby certify that I have this date inspected the mixing and depositing of about cubic feet of concrete which has been deposited in form for section of sea wall No. There have been used in the composition of this concrete cubic feet of stone, ... cubic feet of sand, and cubic feet of cement. I further certify that the mixing and depositing has been according to the terms of the specification governing the contract.

Signed.....Inspector.

Constructing a Concrete Swimming Pool.

Builders are occasionally confronted with rather puzzling problems in the general conduct of their business, these not infrequently occurring in connection with such jobs as the building of a swimming pool, which as is well known quite often leaks to such an extent that it has to be re-lined and made smaller. Interest is therefore likely to attach to some particulars dealing with a carefully designed and constructed pool recently completed in the new gymnasium of the Rensselaer Polytechnic Institute at Troy, N. Y. The pool it may be stated is 75 ft. long and 30 ft. wide, with a depth of 8 ft. at one end and 4 ft. at the other. It is tiled on the bottom and sides with $\frac{3}{4}$ -in. square white ceramic tile laid in cement. The pool is in the basement of the gymnasium in a room 97 ft. long by 40 ft. wide and 18 ft. 6 in. high. The floor around the pool is of terrazzo and the side walls are covered with white tile 3 x 6 in. in size. According to the *Engineering News*, the pool was constructed as follows:

"A bed of clean ashes, 12 in. thick, was placed on the clay foundation. On this was placed a layer of concrete 4 in. thick. Above this came a waterproofing course consisting of a heavy liquid asphalt into which, while hot, a layer of tarred felt, weighing 15 pounds per 100 square feet, was imbedded. This was followed by alternating layers of felt and asphalt until five layers of felt and six moppings of asphalt were applied. All the felt was bedded into the asphalt while the latter was hot, and each layer of felt was completely covered by asphalt. A bed of concrete, 12 in. thick, reinforced with galvanized wire cloth, was laid on the felt. The wire was No. 3 of 3 x 3-in. mesh and the sheets of wire were turned over and locked to each other over the entire bed of the pool. Near the sides of this 12 in. bed of concrete twisted steel bars 10 ft. long of $\frac{1}{2}$ -in. square cross-section, spaced 12 in. c. to c., were imbedded. Seven feet of the length of these bars was imbedded in the 12-in. course and the bars were turned up so that 3 ft. of their length was in concrete side walls, which were carried up from the 12-in. bed. This was done all around the pool and at the four corners these bars were curved in basket form. The bars hold the bed and side walls together and materially help to form a tight pool. The top of this bed and the side walls were then covered with heavy liquid asphalt and five layers of felt and moppings of asphalt were applied as described above for the waterproofing beneath. An additional layer of felt and asphalt was applied at all angles of the pool.

"The sides of the pool were then lined with a brick wall 8 in. thick and the bottom was covered with a layer of concrete 4 in. thick which closely fitted against the wall. All interstices between the brick wall and the waterproofing behind it were filled with grout. This is important. No interstices should be left to exert pressure behind the lining of the pool when the water is drawn off. A pool constructed in New York some years ago had the slabs of marble lining it thrown out by the water pressure behind them when the water was let out of the pool. Water in interstices behind the lining cannot escape as quickly as the water in the pool

and pressure behind the lining under considerable head may result.

"The bottom and sides of the pool are lined with $\frac{3}{4}$ -in. square white ceramic tile laid in cement mortar.

"The scum gutter extends all the way around the pool. It carries off any scum and also any excess of water in the pool. It is drained by twelve 3-in. pipes at equal intervals around the pool. The ends of these pipes are covered with strainers in the bottom of the gutter. There is also a 4-in. overflow pipe at one end of the pool, with a strainer placed about $\frac{1}{2}$ in. above the bottom of the gutter. Cleanouts are provided for all these overflows.

"Provision is made for draining any water which may percolate through the upper layer of waterproofing under the bottom of the pool by means of a 4-in. pipe which leads to a waterproofed manhole outside the pool in the machinery room. A float is provided to indicate the presence of water in this manhole. Such water may then be pumped out. The object is to prevent upward water pressure under the bottom when the pool is empty.

"The water is filtered by mechanical filters before it enters the pool. It passes from a heater, where the temperature is automatically kept constant, to the filters and thence to the pool. Two-inch brass pipes carry it from the heater to two points of discharge; one on each side of the pool near the shallow end. A 12-in. cast-iron circulating pipe extends from the deep end of the pool near the bottom to the machinery room. This acts as a sump for a pump which forces the water through the heater and filters back to the pool.

"Any water on the terrazzo floor surrounding the pool is drained away from the scum gutters to strainers connected with pipes which carry it to the scum gutter drainage system independently of the scum gutters. This keeps any dirty water on the floor from being swept into the pool.

"Eight shower baths and a steam room are placed at one end of the room containing the pool.

A Tall Concrete Chimney

A reinforced concrete chimney now in course of erection on the Pacific Coast will when completed have a total height above sea level of 300 ft. and will be the tallest structure of the kind in that section of the country. It will be 225 ft. above the foundation, which will be 75 ft. above the sea level. The new stack is being erected on the summit of a knoll and at the foundation will have a circumference of 35 ft., and will be sunk 5 ft. 6 in. below grade. The greatest outside diameter will be 19 $\frac{1}{2}$ ft. and the interior diameter at the top of the stack, which will taper slightly from the foundation, will be 12 ft.

The interior of the stack is to be lined with red brick and acid-proof mortar. The claim is made that when completed the stack will withstand a wind velocity of 125 miles per hour and an interior temperature of 1000 degrees Fahrenheit. The stack is being built by stages of about 5 ft. per day. The contract calls for the completion of the work with 120 days from date of commencement.

The chimney is being erected at smelting works near Martinez, Contra Costa County, Calif., the work being done by the General Concrete Construction Company of Chicago, Ill.

A Chicago judge has recently rendered a decision that a flat dweller can make as much noise as he pleases in his own flat at any hour of the day or night. If his neighbors do not like it they can move. We wonder what are the functions of the Board of Health in that city.

CONSTRUCTION OF A TRIPLE BLACKBOARD

An Arrangement for the School Room of Special Interest
to Builders, Carpenters and Cabinet Makers

By CHARLES CLOUKEY

ALWAYS on the lookout for new and desirable things in the building line, and having access to many of the plans of the best architects and builders, I have taken the liberty of showing in the accompanying illustrations, details of a double hung blackboard which was recently specified by an Eastern firm of architects for a Western institute. It is a piece of work likely to interest carpenters and builders having school-house jobs to do.



Fig. 1. shows a section and partial elevation of the arrangement, Fig. 2 a smaller scale elevation of the whole front, and Fig. 3 a detail of the chalk tray.

The whole height of this board from the chalk tray

matter ready to display at a psychological moment in the lesson, and this is readily accomplished by putting it on one of the boards behind and then sliding the others up at the proper time. Or the hidden lesson may be placed on the second one and be out of sight at the top and then pulled down at the moment needed.

It is a fact that this idea may be elaborated considerably, and more than two frames might be used. Indeed, the number of boards possible to install would be limited only by the space at hand and by the natural obstructions encountered by having the writing surfaces farther out of the natural reach of the writer.

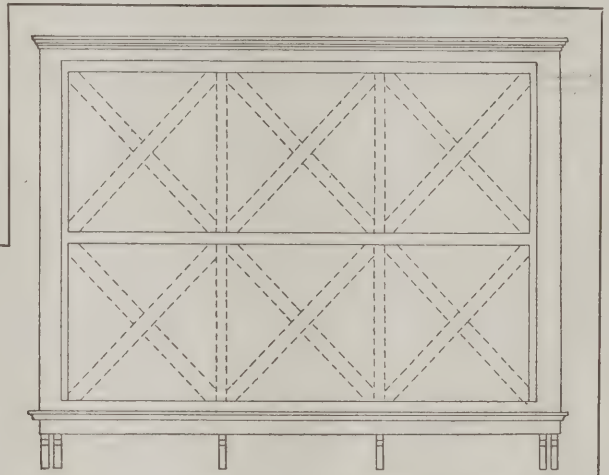


Fig. 2—Front Elevation of the Complete Blackboard

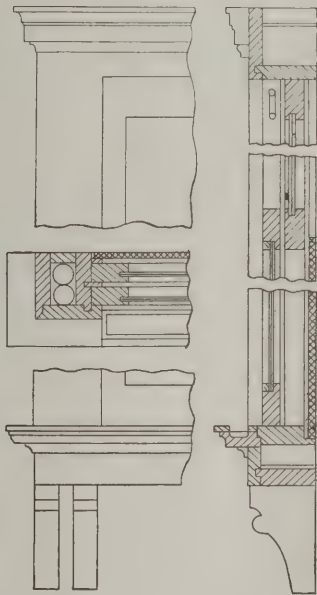


Fig. 1—Sections and Partial Elevation Showing Arrangement of the Blackboard

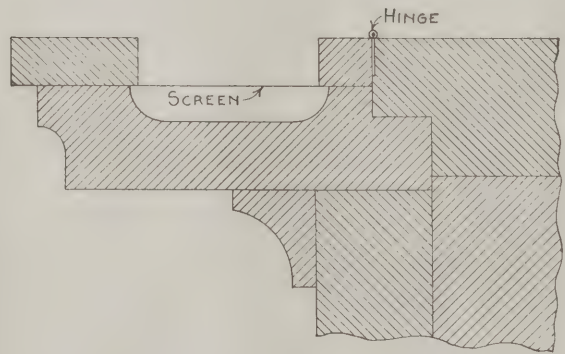


Fig. 3—Section Through Chalk Tray

Construction of a Triple Blackboard—Various Details Showing Arrangement

to the head casing is about 8 feet, making each board about 4 feet high by any width desired.

It will be noted that the slated boards are fastened into frames exactly like glass into a double hung window, excepting, of course, that there is no lipped rail at the middle. Each sash has crossed braces behind the slate, which is calculated to be installed in one continuous section. The board in the frames is of composition, but the board back of the two frames, is slate.

Now, the advantage of this arrangement becomes apparent at once, when it is remembered that in some classes of work it is expedient to hold copy on the board for a considerable length of time. And, again, it is often of considerable importance to have certain

Then, again, they might be made to slide into the walls laterally instead of up, but, of course, this last disposition would necessarily limit the number of boards to be disposed of in the wall. But it often occurs that a board could be slid back behind a cupboard or a case and used as a storage for surplus data, where the space for blackboards is necessarily limited.

The chalk tray is a modification of the original drawing, and the change was along the lines of facility for construction and not to obtain any new principle. The idea of the screen frame in the bottom is to let the dust settle into the trough while the crayon lies on top of the screen wire. The screen frame is hinged to facilitate cleaning the trough.

ESTABLISHED 1879

THE BUILDING AGE

Formerly CARPENTRY AND BUILDING
Copyright, 1913, by David Williams Co.

Entered at New York Post Office as Second Class Mail Matter

Published Monthly by the

David Williams Company
239 West 39th Street New York

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Chas. G. Phillips *Vice-President*
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J. B. Bennett, *Business Manager*

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Subscription Rates: To all parts United States and Mexico, \$1.00 a year; to Canada, \$1.25 a year; to all other countries, \$2 a year.

July, 1913

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New York's New Building Code

Progress is being made upon the new building code for the City of New York, which has been under consideration for a long time past, and it now looks as though the near future would witness the consummation of an end long desired; that is, a building code which would be a credit to the city and a protection to its inhabitants. The Building Committee of the Board of Aldermen engaged in revising the Code, expects to complete its work tentatively at least by the first of July, when advance copies are to be sent to the heads of municipal departments, the Bureau of Municipal Research, architects and builders' associations, the real estate boards and to others for criticism, in order that the Code may be perfected as far as possible before it is reported to the Board of Aldermen. One of the important features is to confer discretionary power in certain channels, but in every case where the building regulations shall be modified by a superintendent of buildings, he must make a record of his ruling for prompt publication and this ruling will be a precedent for the guidance of architects and builders under like circumstances. This, it is felt, will prove more satisfactory in the end than to leave the Superintendents of Buildings entirely without discretionary power. Regulations intended to make buildings safer for their occupants in an emergency is a prominent new principle in the Code and certificates of occupancy will be required by the building bureaus so as to prevent any one from changing a salesroom into a factory, for example, without first obtaining permission.

A Limit for High Buildings

Apropos of the discussion which has been going on relative to the height to which buildings in New York City should be restricted, it is interesting to note the conclusions of Ernest Flagg, a well-known architect of the city, who, in a letter to the Heights of Buildings Commission recently appointed by Borough President McAneny, has suggested means for removing objections to skyscrapers. His idea is to establish a general level of height for all buildings; that is, equal to about once the width of the street on which the building faces without other restrictions as to area than that the least horizontal dimensions of any court or area left vacant for light shall equal a certain proportion, say one-tenth of the height of the wall or walls of the building to which it belongs and which enclose or partially enclose the court or open space. Then on an area sufficiently restricted, say one-quarter of the area of the plot on which the building stands, Mr. Flagg would allow the building to any height without other restrictions than that this part of the building be set back somewhat from the street so as not to darken it. For corner plots and those facing an open space more liberal rules might be made than for inside plots. He would also allow an owner to dispose of his right to build high in favor of any adjoining plot. Mr. Flagg is of the opinion that the effects of such a system would be an efficient check on the erection of high buildings and consequently a check on congestion; the protection of every owner in his fair share of the light of day;

sufficient light for the streets and although the value of the land might be decreased in some instances, the general average of value would undoubtedly be increased. The separation of high buildings which the proposal, if adopted, would effect, would greatly lessen the fire risk and some degree of order would be obtained by the establishment of a uniform cornice line for the street façades at the general level.

Training Boys for the Trades

The vocational training of boys is an important movement in educational circles which is yet too young to have proved its full value. It bears all the earmarks of a successful solution of a modern economical problem, however, and deserves more attention on the part of employers of labor than it has thus far received. There is a wide difference between the trade school and the vocational school as at present conducted, although the object of each is the same—to provide competent workmen in various branches of trade. The purpose of the vocational school is rather to teach the student how to learn. The graduate of a vocational school is not a trained mechanic, but he should certainly prove to be an individual trained to become a mechanic of more than ordinary ability. The trade school has its part in the scheme also. It aims to give to the boy already engaged in the trade facilities for the acquisition of manual skill and theoretical knowledge not available to him otherwise. With the disappearance of the old apprenticeship system and the necessity of each employee of a concern returning a profit on his services the scope of each is broadening. But as the vocational school idea extends the need for the trade school proper will grow less in the same manner as the better and broader education afforded in the public day schools has lessened the necessity of the evening continuation school. At present the greatest need is that of the moral and financial support of all employers of labor, individually or through their trade associations.

Prevailing Rate of Wages

A decision which is of special interest and value to building contractors has recently been handed down by the New York Court of Appeals, the case being one that grew out of the granite work on a municipal building in New York City. The Court held that a sub-contractor doing the granite work on this building in New York City was not required by the labor law to pay to his quarrymen and stone cutters getting out materials for the building in the State of Maine the prevailing rate of wages in New York City. It pointed out that such quarrymen and stone cutters are not, within the intent of the law, employed "on, about or upon the construction of the building."

It appears that the contractors, the Thompson-Starrett Company, sub-let the granite work to the Mount Waldo Granite Works, which is a Maine corporation. The work of quarrying, cutting, dressing and trimming the granite was done in the state of Maine and the workmen were paid \$3 per day—the prevailing rate of wages in that state. The prevailing rate of wages for the same class of work in the city of New York is \$4.50 per day, and the charge was made that Section 3 of the Labor Law was violated. The con-

tractor and the sub-contractor both agreed to comply with the provisions of the New York Labor Law. In handing down its decision the Court of Appeals declares that the statute was not designed to increase the wages paid to workmen in the State of Maine.

Our Cover Design for August

We have taken for the subject of the cover design for next month a gambrel roof country house of colonial architecture with an open porch extending across each end of the building. The wide clapboards with which the exterior is covered are to be painted a cream white and the roof shingles are to be laid with an uneven line and stained a moss green.

The plan provides a commodious living room, dining room, kitchen and bedroom on the main floor with the stairs placed in the center toward the rear and lighted at the broad landing by a window placed just under the eaves.

On the second floor are four sleeping rooms and bath, together with an unusual amount of closet room, this being possible by reason of the shape of the roof. The stairs land in the center of the building so that every room is readily accessible from them.

The house is of a character to bring its cost, according to the architect, inside of \$3,500, and in connection with the design memorandum specifications and estimate of cost will be published.

Officers of New York Society of Architects

At the annual meeting of the New York Society of Architects held the latter part of May officers, directors and standing committees were elected. The officers for the ensuing year are:

President.....C. Schumann.
Vice-Pres......J. R. Gordon.
Treasurer.....L. Berger.
Secretary.....W. T. Towner.

Standing committees were chosen on Membership, Year Book, Tenement House Laws, Professional Practice, Factory Laws Registration, Fire Laws, Building Code, Competition and Civic Improvements.

The directors' meetings for the year will be held on the first Thursday evening of each month, and the general meetings on the third Tuesday.

Columbus Contractors' Association Elects Officers

Festus Hague Nichol, commonly known in Columbus, Ohio, building circles, as the "Globe Trotter," and a sketch of whose business career appeared in these columns in November last, was elected president of the General Contractors' Association of Columbus at a meeting recently held. George Seltsam was re-elected secretary and D. W. Appler treasurer.

Officers of New York Architectural League

At a recent meeting of the Architectural League of New York the following officers for the ensuing year were elected:

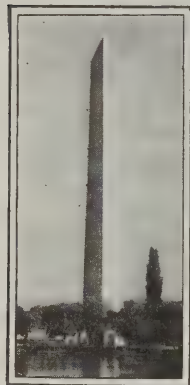
President.....Cass Gilbert.
First Vice-Pres......Robert Aitken.
Second Vice-Pres......George W. Breck.
Treasurer.....Joseph Howland Hunt.
Secretary.....Stowe Phelps.

The meeting was held at the League headquarters, 215 West Fifty-seventh Street.

CONVENTION OF SHEET METAL CONTRACTORS

The Commercial Advantages of Membership Emphasized—Economy to Members in the Cost of Liability Insurance—Officers Elected

THE tenor of the various reports presented and of the discussions of topics considered at the ninth annual convention of the National Association of Sheet Metal Contractors in the city of Washington, D. C.,



June 9 to 14, was the commercial advantages of membership in that organization. In their respective reports the president and secretary dwelt upon the economy the Association had been able to offer its members in the cost of liability insurance alone. The warm-air furnace situation was discussed at length and suggestions offered calculated to render it more highly satisfactory. The local association had prepared with special care for the entertainment of the delegates to the convention; booths for the exhibition of manufacturers' goods were provided and

every facility afforded in the installation of the exhibits. Entertainment for the ladies was provided with a lavish hand and the committee received many deserved compliments for the success with which the plans were executed.

Where the Sessions Were Held

The sessions were held at the new Masonic Temple and after a few remarks President Hussie introduced the Hon. C. H. Rudolph, president of the District Commissioners, at one time engaged in the sheet metal business, who extended a cordial welcome to the delegates and invited them all to make themselves at home.

President Hussie was presented with a gavel made from a door in the Senate Chamber and used in 1808, the presentation being by Paul F. Brandstedt on behalf of the Washington Association.

President Hussie then delivered his annual address, in which he referred to the organization work of the secretary and to the relations of the association with labor and with manufacturers. Special reference was made to the great benefit accomplished by the Association in securing for the members reduction in rates on liability insurance. It was pointed out that a saving of about 20 per cent. on premiums secured to Association members was in itself more than equal to all the dues paid by the members into the national treasurer. The president also expressed the belief that the time is ripe for the formation of state associations in many states.

Report of Secretary

The report of the secretary showed a net increase in membership for the year of approximately 300. The secretary dwelt upon the liability insurance plan and its economy to members and also pointed out the vital feature of the plan—that of compelling a complete record of all matters pertaining to the insurance of members taken through the Association.

A feature of the meeting was an illustrated lecture on ornamented tin roofing by H. N. Taylor, of the N. & G. Taylor Company, of Philadelphia.

On the morning of June 11 the meeting opened with a discussion of the advisability of guaranteeing the durability of a tin roof and in this a number of the delegates participated.

There was an illustrated address by J. T. Hay deal-

ing with the methods of producing Toncan metal in the Stark Rolling Mill plant at Canton, Ohio, the stereopticon views which were used including many showing buildings and construction in which the material had been employed.

Report of Warm Air Furnace Committee

The afternoon session was largely given up to a report of the warm-air furnace committee by W. R. Taylor, chairman, who explained that he had sent a letter to furnace manufacturers and the replies received indicated sympathy with any concentrated effort to advance the interests to increase the sales of warm-air furnaces. Various members participated in the discussion which followed. A resolution was offered asking the furnace manufacturers to form a national organization to co-operate for the promotion of the furnace business.

G. R. Kerr of the Follansbee Brothers Company gave a lecture illustrated with lantern slides on the manufacture of tin plate, and this session of the convention was attended by 150 architects and builders of the city and vicinity.

On June 12 there was an illustrated lecture on the manufacture of sheets and plates by G. F. Ahlbrandt of the American Rolling Mill Company, at the close of which the convention adjourned to the steps of the capitol building to be photographed. The afternoon was spent in sightseeing and in the evening there was a banquet at the National Hotel.

The last day's session opened with the report of the Board of Trustees, in which the secretary was instructed to continue to carry the amounts collected for liability insurance, make remittance to the insurance company and report monthly to the board, turning over to the treasurer the 5 per cent. collected when it amounted to more than \$100 to become a part of the Association's fund.

Amendments to the by-laws were adopted providing for representation by state associations by means of state delegates.

Election of Officers

In the afternoon various resolutions were adopted and officers for the ensuing year were elected as follows:

President...J. A. Daugerty, Nashville, Tenn.
First V.-Pres....P. F. Brandstedt, Wash., D. C.
Second V.-Pres....K. I. Willis, Moline, Ill.
Third V.-Pres....Julius Geroch, St. Louis, Mo.
Fourth V.-Pres....W. C. Torbett, Waco, Tex.
Secretary...E. L. Seabrook, Philadelphia, Pa.
Treasurer...W. A. Tingles, Baltimore, Md.

The convention accepted the invitation of Cincinnati to hold the 1914 convention in that city. After discussing matters for the good of the Association the convention adjourned.

Dr. Elmer E. Brown, of E. E. Brown & Co., manufacturers of sash weights, Philadelphia, Pa., died at his home in that city, May 23, after an illness of several months. He was born at Rising Sun, Md., in 1861, and began the manufacture of sash weights in 1886 under the style of E. E. Brown & Co. While conducting this business he took up the study of medicine in Jefferson Medical College and was graduated in 1897, but did not practice. For many years he was president of the late National Sash Weight Association.

SANITARY FLOORS FOR THE DAIRY BARN

Suggestions for Laying Concrete Floors with Farm Labor—Planning and Grading the Floor—Mixing and Laying the Concrete

ONE of the pronounced tendencies of the present time is to make the dairy barn so far as it may be possible a sanitary structure and one of the prime requisites to this end is to have the floors of concrete. The method of laying such floors involves no great difficulty and the cost is so small compared with the benefits derived that the floors soon more than pay

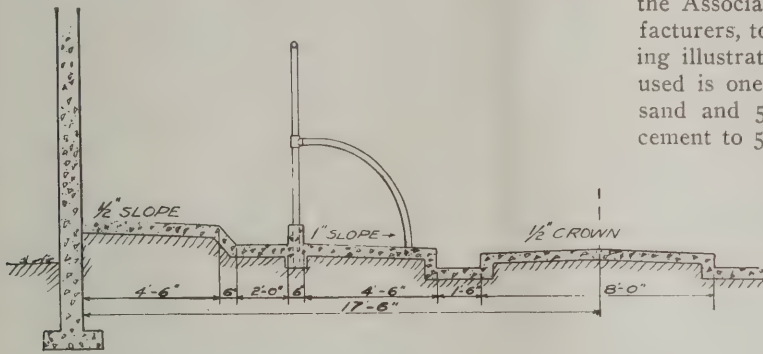
stall floor at the gutter. Set a similar board 5 ft. distant to mold the 6-in. manger wall and stanchion setting. It should be borne in mind that the stall floor has a slope of 1 in. toward the gutter and that the stanchion setting rises 7 in. above the stall floor. Drainage for the gutters and mangers may be provided by sloping their concrete bottoms. According to the Association of American Portland Cement Manufacturers, to whom we are indebted for the accompanying illustrations, the proportions of the mixture to be used is one bag of Portland cement to $2\frac{1}{2}$ cu. ft. of sand and 5 cu. ft. of crushed rock, or one bag of cement to 5 cu. ft. of clean pit gravel. At one operation lay the full 5 in. thickness of the

stall floor and finish three stalls the same as one section of sidewalk. No surfacing mortar is required.

For setting the patented stall divisions it is only necessary to follow the manufacturer's directions; for home-made divisions make mortises by tamping the concrete around greased tapering wooden cores, which are to be withdrawn as soon as the concrete stiffens.

A wooden float is best for finishing the floor as a steel trowel gives a surface entirely too smooth, and such a finish should always be roughened by brushing with a stable broom. Fig. 2 gives a view of the driveway with the swinging stanchions and concrete mangers.

While the concrete of three stalls is still soft, mold the stanchion setting, 6 in. thick, upon it. For "forms" use the projecting 7 in. high of the 2 x 12-in. piece already in place and two 1 x 6-in. boards toe-nailed together so as to provide another 7 in. in high and a bearing plate to rest on the green concrete. These forms may be made dish-shaped for the swinging stanchions. Fill the forms with mushy wet concrete, trowel the surface around the corners and set the



Sanitary Floors for the Dairy Barn. Fig. 1—Cross-section Through the Concrete Floor

for the time, labor and materials involved in their construction.

The scheme described in what follows relates to a barn in which the two rows of cows stand with their heels toward each other and having a central driveway between. The plan, however, is one which may be easily modified to the opposite arrangement should circumstances make this desirable and at the same time the method is readily adaptable to both old and new barns. In planning and grading the floor the stalls for average conditions are laid out on 3 ft. 6 in. centers and 4 ft. 6 in. in length, measuring from the 6-in. manger wall to the drop gutter, as shown in Fig. 1, which represents a section through the floor.

The manger is 2 ft. 6 in. wide at the top and 2 ft. at the bottom with one face sloping up to the feed-alley floor. The depth is 7 in. measuring from the stanchion setting and 8 in. from the alley floor.

The feed alley is 4 ft. 6 in. wide and the drop-gutter has a width of 18 in. It is 8 in. deep gauged from the stall floor, which is 2 in. higher than the 8-ft. driveway. For establishing grade lines a carpenter's spirit level or a water level with chalk line was very helpful.

As a foundation for the stall floors proper place 6 in. of coarse broken stone or screened gravel so as to keep the floor from direct contact with the ground. Since the stall floors are of prime importance it is well to make them first and during the operation the unpaved driveway and alleys can be used as working space.

In carrying on the operation the feed alleys should be finished first, then the driveways, next the mangers and lastly the gutters.

At a distance 5 ft. 6 in. from the center line of the driveway stake on edge and to the line and grade, a 2 x 12-in. plank which will serve as a form for the



Fig. 2—View of Driveway with Swinging Stanchions, Concrete Mangers and the Two Lines of Drop Gutters

stanchion holders. Repeat the operation until all stall floors are completed.

The feed alleys and driveways are easily built, as they are merely rough-finished sidewalks. Place the waste-water outlets in the mangers at intervals of 28 ft. and give the bottom a slope of 1 in. toward each outlet for a distance of 14 ft. on each side of it.

The drop gutters may be drained in like manner or

can be sloped slightly in one direction for their full length. For ease in cleaning, round all angles and corners, except at the bottom of the drop gutters, by applying a 1 to 2 cement-sand mortar immediately after removing the "forms."

With the proportions and thickness above given four bags, that is, one barrel of cement, 10 cu. ft. of sand—say $\frac{3}{8}$ cu. yd.—and 20 cu. ft. of crushed rock—about $\frac{3}{4}$ cu. yd.—will lay 45 to 50 sq. ft. of floor. The usual cost of this amount of material being \$2.50, the floor soon pays for itself many times over.

English vs. American Types of Suburban Homes



UPON his return from abroad after a study of English suburban types of homes, H. S. McKnight expressed the following views as to the results of his observations:

"Villages in England have grown slowly, and builders have kept on working after the old traditions, so that all the houses are of the same style. Perhaps the more marked feature is the desire to be secluded from the public. The people live close together in small, low

houses, enclosed by wall hedges, and avoid ostentatious effects, such as would appeal to the American public.

"The compactness of English villages is due partly to conditions which do not exist with us, such as the fact that the residents were often merely tenants of a landlord, and had little land of their own. Then the older towns were built with walls for protection, and the houses crowded inside on narrow, crooked streets. The suburbanite of New York buys as much land as his income can pay for and embellishes it with bowling green and pergolas, without feeling that he is going beyond his means. But, at the same time, we lose compactness which makes the villages of England seem like a unit.

"The tendency in our suburban developments is to do away with walls and fences and to open lawns and gardens to the passer-by. In English villages, the public are shut out as much as possible from the private grounds by wall hedges, or fences. While we do not care for such seclusion, we must admit that their compactness of arrangement and development of every foot of space give them a harmonious character which we are endeavoring to get in our own.

"The architecture of the English villages is essentially Gothic. That is, the type of building was evolved from mediæval times and handed down from master to apprentice, adopting only to a limited extent the suggestion of the Flemish and Italian brick work, and the architects trained in the manner of Palladio, who built the large Elizabethan and Georgian country houses.

"The styles vary according to the districts and the material. The most familiar style of building, and the one which we are most apt to imitate on the estates of Great Neck, is the half-timber work. This style was particularly developed in Cheshire, Shropshire and Halfordshire, on the border of Wales. Half timber is very decorative. The only obstacle is in making it weather-proof in our climate.

"In the Eastern country plaster is used in a special manner called 'pargetting.' It is moulded and stamped into various conventional designs. Much more severe in character are the cottages of the Cotswold district. These buildings are all of stone. The houses have gable ends, carried above the roof in copings, often crowned in a decorative manner.

"In contrast to buildings of the Cotswold district, the

Devonshire cottages are irregular of outline, with curved corners and hipped roofs of thatch, built of cob or a mixture of mud and straw trodden down by the feet, and the supports strengthened by stone buttresses. The thatch roofs are unrivaled for picturesqueness, and were formerly used in all parts of England, but they are now being replaced by tiles or slate, which would more nearly satisfy our ideas of fire-prevention and sanitation.

"The same homely qualities of strength and sincerity mark the inside of the English cottages as well as the outside. They are generally only one room wide. This simplicity of form is in contrast to our modern picturesque cottages with our variety of projections and roof inclines. The English cottages are low-studded, with the ceiling beam exposed, and their great feature is the fireplace, often of huge dimensions, which not only serves to warm the room and cook the meals, but forms the center of family life."

Fire Test of Doors by British Committee

Fifty-eight fire tests on various types of shutters and doors are recorded in the seventh annual number of the *Journal* of the British Fire Prevention Committee. The particulars given relate to the trade description of the door, the name of the firm who had submitted it, the material and method of construction, its size, and the temperatures withstood for certain periods, with a summary of the observations made during the tests.

Out of the 20 tests for the maximum standard of full protection only one door withstood the 4 hours' trial, conducted under a fire temperature of 2060 deg. F. On two separate occasions two shutters together withstood a 4-hours' fire test, and were allowed to pass the first standard, although the maximum temperatures of the fires were only 1730 deg. and 1820 deg. respectively. Another shutter withstood a fire for $2\frac{1}{2}$ hours, when the temperature was only 1540 deg., and was passed in the second class of full protection.

Seven trials were carried out by the committee for partial protection, but not one door passed successfully. Since the summary was prepared, however, a small American door of 21 sq. ft. in area has been classified as affording partial protection. In the remaining 31 tests, which were for temporary protection, only four doors passed—a solid steel door, two armored doors made of deal covered with tin steel sheets, and a composite door made of oak and asbestos.

Constructing Stucco Houses Without Sheathing

Throughout eastern Massachusetts and more especially perhaps in the many attractive suburbs of Boston and vicinity, the stucco house has rapidly grown in popularity and number. A method of construction much in vogue is one which, while it does not vary materially from that used in building the ordinary frame cottage or bungalow, eliminates the use of the customary sheathing boards. Instead of the latter the metal lath is applied to the outside of the studding and plastered in the usual way, but before the lath for the interior is applied the exterior is back plastered between the studding. A number of houses of this nature have been erected during the past year at Kenberma, Mass., at a cost which is said not to have exceeded \$1,275 each. In doing the work Kno-burn Expanded Metal Lath was used on all the houses.

The Seventh Annual Convention of the National Society for the Promotion of Industrial Education will be held in Grand Rapids, Mich., October 19 to 25.

DOUBLE HOUSE OF HOLLOW WALL CONSTRUCTION

A Two-Family Affair Providing Modern Conveniences and Constructed
with Walls Having a Continuous Dead Air Space

THE concrete house which forms the basis of the present article is designed for occupancy by two families, each having rooms upon the first and second floors. The building is of that type usually designated as a "double" or "twin house" in contra-distinction to the two-family house as commonly understood wherein the rooms of each family are all on one floor. The picture here given affords an excellent idea of the appearance of the building, while the floor plans on the next page show the general arrangement of the rooms.

An inspection of the plans shows that there are on the main floor parlor, dining room and kitchen, with

of the sink is a dresser and directly under the drain-board is a radiator.

On the second floor each family has three sleeping rooms and a bath room. The front sleeping room has an alcove 6 ft. 6 in. by 9 ft. 6 in. and is separated from the main room by a cased opening. The principal sleeping rooms have closets, while the rear sleeping room has a built-in wardrobe. The bath room has a medicine closet over the wash basin with 12 x 16-in. mirror in the door.

The stairs from the first floor land near the center of the building and extending from them toward the



Photographic View of Double or "Twin" House of Hollow Wall Construction—Rees & Ade, Architects, Rochester, New York

communication between the two latter being established by means of a pantry fitted with dresser and having drawers and closet underneath. The dining room has a built-in buffet with a closet on either side. One of these closets has its floor 2 ft. higher than the main floor in order to provide necessary head-room for the cellar stairs leading down from the kitchen.

The kitchen is equipped with gas range, two-part laundry tubs and sink with drainboard placed directly under the rear window so as to provide ample light. This is a feature which is not always given the attention which its importance demands, the sink often being placed in some corner or on a side of the kitchen away from a window where the light is poor and the arrangement decidedly unsatisfactory. At the right

rear is a hall from which the sleeping rooms and bath room are readily accessible. Near the top of the main flight of stairs is a ladder in a little closet provided for the purpose which leads to the roof through the scuttle directly over-head.

A skylight is so placed in the roof of the house as to furnish light to the second story hall and especially to the main flight of stairs.

The rooms of the house are heated by steam, the position of the radiators being clearly indicated on the floor plans.

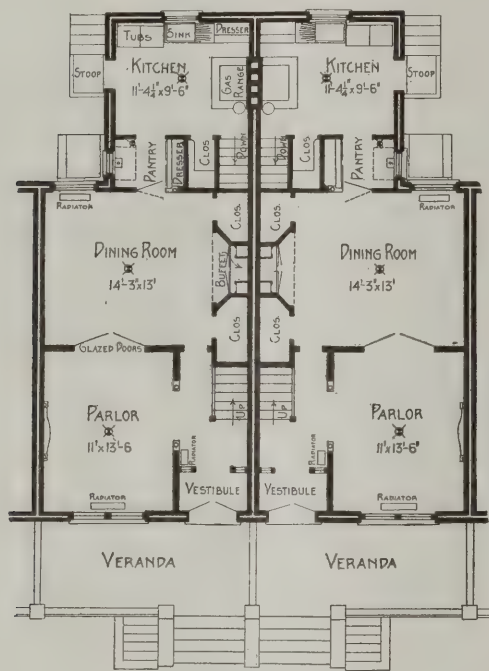
The house is of stucco finish with metal tile covering the roof of the porch and that portion of the front of the house directly above the main cornice.

The outside walls of the house as well as the party

wall separating the apartments of the two families are of reinforced concrete construction, there being in each case two 4-in. walls with a $2\frac{1}{2}$ -in. air space between them. The air space is practically continuous from foundation to roof and extending entirely around the building, except, of course, where openings in the walls occur for doors and windows. This form of construction is generally regarded as rendering a house much cooler in summer and warmer in winter, while at the same time the presence of the dead air space tends to prevent the transmission of moisture. The work was done by the use of hollow wall machines made by the Van Guilder Hollow Wall Company, 712 Chamber of Commerce Building, Rochester, N. Y.

The house here shown was erected in accordance with plans of Architects Rees & Ade, 541 Granite Building, Rochester, N. Y., the work being executed by the Hollow Wall Construction Company, 280 Broadway, New York City.

This double house is located in East 12th street,

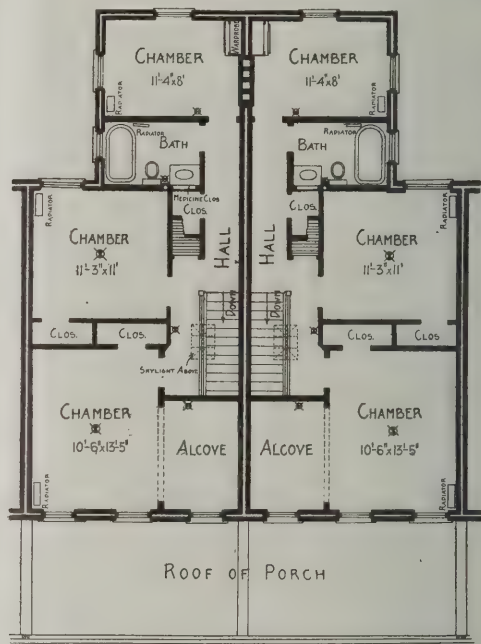


Main Floor Plan

the interior finish. Numerous entrances have been provided for easy access to the concourse and the main building. Another noticeable feature is the elimination of all posts, pillars and columns. Close attention has been given to the convenient arrangement of ticket offices, baggage rooms and information bureaus which will assure the expeditious handling of passengers and baggage. Facing the concourse will be two sets of tracks—26 lines in all, 10 going to the north and 16 to the south.

A City of Warehouses

In connection with the plans agreed upon recently for the West Side improvement of the New York Central Railroad in New York City is to be a series of warehouses, ten in number and each ten stories in height including the subsurface floors which are to be traversed by numerous railroad tracks and switches. Seven of these warehouses will be located on the blocks extending from 11th to 12th Avenues and from 30th to



Second Floor Plan

Double House of Hollow Wall Construction—Floor Plans—Scale 1/16 in. to the Foot

Brooklyn, and is one of a number which the company in question are building in the Flatbush section.

Chicago's New Union Station

Considerable interest among architects and builders of the city is being manifested in the plans for the new Union Railroad Station to be erected in Chicago in accordance with the design of D. H. Burnham & Co. The site of the new building is that of the present Union Passenger Station at Canal and Adams streets. Two of the special features of the building will be a huge public "concourse"—a covered building 250 ft. long and 180 ft. wide—and a waiting room in the main station, which will be 300 ft. long, 100 ft. wide and 120 ft. high. The entire building will cover a space 320 x 370 ft.

The architecture will be in the classic style freely interpreted and adapted to modern requirements. It will be featured with a Corinthian colonnade around the four sides of the building rising 64 ft. from the ground and will be surmounted by a high attic story forming a complete belt around the structure.

American white granite has been chosen for the exterior and white stone will play an important part in

37th Streets, while three of them will be located on the blocks extending from 10th to 11th Avenues and from 30th to 33rd Streets. These blocks are each approximately 625 ft. wide and the ten floors of each of the ten buildings will give a net floor space of 9,100,000 sq. ft., or about 210 acres. These figures do not include the 425 x 100 ft. allowed for shaft space—the maximum allowance for such purposes in storehouse.

The New Equitable Building

The contract for the structural steel for the new 36-story Equitable Building in lower Broadway, New York City, the modified plans for which have just been approved, calls for approximately 35,000 tons of the metal, and is said to represent the largest order for steel ever placed for a single structure. The building will cover a plot 167 x 310 x 152 x 305 ft., and architects D. H. Burnham & Co. of Chicago estimate the cost at \$8,000,000.

The general contract for the new building is in the hands of the Thompson-Starrett Company, which has awarded the contract for the cofferdam and foundation work to the O'Rourke Engineering & Construction Co.

New Publications

Carpentry and Joinery.—By Gilbert Townsend; 258 pages. Size, $5\frac{3}{4} \times 8\frac{1}{2}$ in. Illustrated with 368 line and half-tone engravings. Bound in stiff covers. Published by American School of Correspondence. Supplied by *Building Age* Book Department, 239 West 39th Street, New York City. Price, \$1.

This is a work which the carpenter and the builder will find of special interest and value by reason of the logical manner in which the subjects are treated and the details presented. The author points out in his introductory remarks that with all the strides which have been made in steel and concrete construction and in the face of the development in mill work and in the manufacture of special building material, no method has ever been devised for dispensing with the services of the carpenter who is clever in the use of his tools. His knowledge of lumber and of its behavior under varying conditions; his ability to perform rapidly and in workmanlike manner the many details connected with the frame, the roof, the walls and the exterior and interior finish of a building, combined with his technical knowledge of the simpler elements of construction constitute him an efficient workman and give him the ability to rise to higher things. It is with the idea of satisfying a real demand for a practical work on carpenter and joinery which shall cover in every detail the many problems which confront the present-day carpenter, contractor and builder that the volume under review has been published. It is especially adapted for purposes of self-instruction and home study and the utmost care has been used to make the treatment appeal to the trained expert as well as to the beginner and the self-taught practical man.

The matter is comprised in four parts, the first of which deals with timber in its natural state, its varieties and general characteristics; also the various tools used by the carpenter and the laying out of the foundations for a building.

Part two deals with the framing, the joints and splices in carpentry and joinery, the wall, the partitions, and shrinkage and settlement.

In part three the author takes up the roof and considers its various styles, the method of framing attic partitions, special framing, such as trussed partitions, inclined and bowled floors, heavy beams and girders, balconies and galleries, and he also describes the various kinds of timber trusses, while giving more or less attention to towers and steeples.

The fourth part of the work deals with exterior and interior finish and is profusely illustrated with engravings of a character which clearly show all the various details relating to outside wall finish, roof finish, window and door finish and the trim.

Not the least valuable feature of the work is an index alphabetically arranged.

The Swiss Chalet Book.—By William S. B. Dana; 151 pages. Size, $7\frac{1}{2} \times 10$ in. 250 illustrations, including numerous half-tones. Bound in cloth. Published by William T. Comstock Co. Supplied by *Building Age* Book Department, 239 West Thirty-Ninth Street, New York City. Price \$2.50.

Occasionally one runs across a book which stimulates his interest in a certain profession. This is the case with the Swiss Chalet book, which holds the interest of the reader partly from the fact that, unlike many publications of the present time, its author is willing to confine his attention to a certain restricted field and to develop this subject along logical lines. The Swiss chalet is an architectural phase evolved to meet certain conditions of climate and topography, and the book under review is a minute analysis of the chalet of

Switzerland obtained by a special visit to that country by the author.

After a general view of the subject, followed by a consideration of the materials of construction and various prototypes of the chalet, the author enters into a detailed discussion of the various parts of the structure and gives a minute analysis of the type from an architectural standpoint, as well as from that of the practical builder. The last chapter of the book is devoted to a discussion of the adaptation of the Swiss chalet in other countries, with special emphasis on the American adaptation as found in California and other states of the Union. A bibliography is appended to assist the reader in further research.

Practical Cement Work.—By W. B. Henry; 110 pages. Size, $5 \times 7\frac{1}{4}$ in. Bound in stiff covers. Published by Concrete Age Publishing Company and supplied by *Building Age* Book Department, 239 West 39th Street, New York City. Price, 50 cents.

The constantly increasing volume of construction work involving the use of cement renders especially interesting literature dealing with the subject. The little work under review handles it from the elementary standpoint and is based upon the many years of practical experience which the author has had as a mason laborer. There are many carpenters and builders who are giving more and more attention to the matter of cement work and the shape in which the information contained within the covers of this little book is presented cannot fail to appeal to them. Attention is first given to natural and Portland cement, sand, mortar and the mixing thereof; concrete, both plain and reinforced; then there is a chapter on waterproofing concrete; another on coloring, while a third deals with cost data, which will be found of special value.

The second part of the little work considers foundations and walls and tells how to build cement houses. The author has something to say about specifications, cement plaster and stucco houses, sand-lime brick, sidewalks and floors for cellars, basements and stables.

Ancient Stained and Painted Glass.—By F. Sydney Eden. Size $5 \times 6\frac{3}{4}$ in. 160 pages. Profusely illustrated. Bound in stiff covers. Published by G. P. Putnam's Sons. Price 40 cents net.

This little work by an English author makes no pretense of giving an exhaustive account of the subject indicated by the title but only to supply sufficient data to afford an intelligent idea of such remains of stained and painted glass older than 1700 as are still to be found in ancient buildings. There are eight chapters, and following the introduction attention is given to Norman and Early English Styles, the Decorated Style, the Perpendicular Style, Renaissance and the Seventeenth Century and later. There is a very interesting chapter on Heraldry in Glass, a branch of glass painting which longest resisted deterioration. One reason perhaps for this was the reserve imposed upon the painter by the rules of Heraldry, for he could not go beyond the four colors commonly used in the science.

Several of the illustrations with which the letter press is embellished are taken from the County of Essex, which is generally supposed to be below the average in the remains of old painted glass. The author points out, however, that it would not be difficult to illustrate all the styles in painted glass by fine specimens from Essex alone.

The movement lately inaugurated among builders and contractors of Janesville, Wis., has resulted in the organization of a Builders' Exchange, with headquarters in the Southerland Block.

Freezing Process in Building Construction

The freezing process in connection with excavations for the foundations of buildings appears to be something of a novelty in foreign countries, although many instances of it have occurred in the United States. The process, however, has recently been applied with economy and general satisfaction in Berlin, where the foundations of a large building had to be carried 10 ft. below the foundations of the abutting structures. As the latter were built on running sand it was entirely out of the question to excavate for the new structure without special precautions and the freezing process was adopted as an alternative to the pneumatic caisson method.

Freezing pipes of 5 in. diameter were sunk around the space to be excavated and connected by headers with a brine pump and tanks. The cold brine was pumped through 1 in. pipes enclosed in the 5-in. pipes and the brine was returned to the tanks through the latter.

When the apparatus was put into operation the effect was to establish a stable barrier of frozen quicksand, permitting the foundation space to be excavated by ordinary means without difficulty.

Fees of an Architect

In view of the many published statements about the large fee to be received by Guy Lowell, the architect of the New York County Court House, it is interesting to observe the element of uncertainty which attaches to the profit to be derived from an undertaking of this magnitude.

The cost to an architect of preparing his drawings and specifications and seeing that they are properly carried out, in offices run on the best business basis, is at least one-half of his commission. This, however, applies only to the general class of buildings and not to residential or public and monumental work. The cost is then as high as 75 per cent. of the architect's commission.

The United States Government prepared a statement which was submitted to the Second Session of the 62d Congress, which gave the average cost of preparing drawings and specifications alone, exclusive of superintendence or any other field expenses for the years 1905 to 1911, inclusive, to be 6.2 per cent. This was for preparing the drawings for the buildings erected by the United States Government and done by the supervising architect of the Treasury, a man known for his great executive ability, and, therefore, done with the greatest economy possible.

Reports have been submitted by the State Architect of New York showing that the cost to the State for preparing the plans and specifications made in the State Architect's offices exceeds 6 per cent. The cost to the New York Central Railroad for preparing the plans for its new station has exceeded 6 per cent. Therefore, an architect who is able to prepare the plans for a \$10,000,000 building at a cost to him of less than 6 per cent. of the total cost of the building, must run his office in the most economic manner possible and take his chance that the work may cost him more than his entire fee.

It seems to be the general impression in many uninformed places, says D. Knickerbacker Boyd, Chairman of the Committee on Public Information of the American Institute of Architects, in a recent issue of the "Public Ledger," that an architect makes a few sketches taking a few days of his time and for this work receives an enormous fee. The fact of the matter is that to prepare the plans and carry out the work of a \$10,000,000 court house, will require the services of

from 20 to 30 high-priced draughtsmen, as well as a number of engineers and specialists on structural work, heating and ventilation, sanitation, mechanical equipment, etc., working for a period of at least five years; will require a large office at a high rental, and with the most economic administration, his work will cost about \$450,000. This will leave him about \$150,000 profit, or about \$30,000 a year.

What business man is there who is willing to head a \$10,000,000 corporation with a salary of \$30,000 a year? What corporation is there of this size that pays its counsel less than this amount? Such men, however, receive these salaries without investing any of their own money to obtain it. The architect must invest about \$450,000 in actual cash paid out to receive his profit of \$150,000.

All of the above has nothing to do with the professional training and skill of the architect and for which he receives his compensation. He must, therefore, not only invest his own money and run a large business office with a chance of running it at a loss, but he must give his skill in designing, his knowledge of engineering and construction, and his training in sculpture and mural decoration in order that he may obtain his fee.

Of course, it would be possible for an architect to have his work cost him less than one-half of his commission, and the result would be poorly prepared plans and specifications and inadequate superintendence of the erection of the building, which would result in a greater cost of the building, a far greater cost than any saving in the commission paid to the architect. In carrying out the work of the new court house, the architect will have to give almost his entire time and attention to this one piece of work and in comparison to the fees or salaries paid to the best men in other professions, his compensation will be very small.

New Shingle Specifications

A new law has been passed by the Massachusetts Legislature governing the manner in which shingles must be put up for sale in that state. The first section reads as follows:

In this commonwealth all random width wooden shingles shall be sold in bunches or bundles measuring not less than twenty inches in width and containing not less than twenty-three courses or layers on one end and not less than twenty-four courses or layers on the other end. The shingles in each bunch or bundle when laid five inches exposed surface to weather shall cover twenty-five square feet in area. Four such bundles of shingles shall constitute a unit of measure termed a thousand.

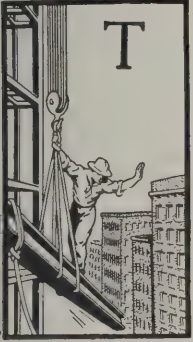
All violations of the act are punishable by a fine for each offense.

One of the landmarks of the earlier days of upper New York when that particular portion was known as the Bloomingdale Section, was the old Straus dwelling, with its extensive grounds running from Broadway to West End avenue at 105th street. The old frame house has recently been demolished together with its more modern carriage house and stable in order to make room for a 12-story apartment house, which now covers the entire plot and cost in the neighborhood of three-quarters of a million dollars. The architects are Schwartz & Gross, 347 Fifth avenue, New York City.

An exhibition of the work of the pupils of the Baron de Hirsch Trade School, 222 East Sixty-fourth Street, New York City, occurred on June 9. A large number of friends inspected with great interest what the students had accomplished, the work covering a wide range and showing in marked degree the proficiency in the different branches of trade taught.

WHAT BUILDERS ARE DOING

Bird's-Eye View of Building Situation in Leading Cities—Estimated Value of the Projected Improvements



THE annual meeting and banquet of the Baltimore Builders Exchange was held at Hotel Belvidere on June 14, the occasion being in the nature of a Silver Jubilee. The permanent organization was effected 25 years ago on May 22, 1888, when 56 members were enrolled. The original subscribers embraced the then prominent builders, contractors, supplymen and manufacturers engaged directly or indirectly in the building industry.

At the present time the building interests of the country have come to regard the organization as something more than a mere association of men engaged in building. It has originated features which have attracted national attention and through it with the co-operation of the Exchange at Washington it organized the Inter-States Builders and Traders Association of Maryland, District of Columbia and Virginia, which embraces the Builders Exchange of those sections. It was also an active agency in forming the National Building Trades and Employers Association of the United States of America. Herbert J. West, second vice-president, and I. H. Scates, secretary of the Baltimore Exchange, are respectively president and secretary of the Inter-States and National Associations.

For years the establishment of trade schools has been strongly advocated by the Baltimore Exchange, as it realized that skilled labor is essential to the maintenance of the standard of America's mechanical efficiency. It has urged the needs of training schools where boys could obtain a practical knowledge of the mechanical arts and the Exchange offers a cash prize of \$50 to be awarded annually to the pupil who has passed through the academic course and who shows the highest average in his studies.

A fact worthy of note is that in the quarter of a century the Builders Exchange of Baltimore has been in existence it has had but two treasurers and three secretaries. In an organization of the character of this Exchange much of the practical work devolves upon the secretary. Upon his efforts and personality depend largely the growth and development of the organization. When the present secretary, I. Herbert Scates, was elected in June, 1907, the roster showed 145 names; today the membership is 325.

At the annual election of officers, held on June 10, the following were chosen to serve for the ensuing year:

President.....William H. Morrow.
First Vice-Pres......William D. Gill.
Second Vice-Pres......Herbert J. West.
Third Vice-Pres......A. J. Dietrich.
Secretary.....I. Herbert Scates.
Treasurer.....S. Frank Bennett.

Owing to the crowded condition of the hotels and anticipating the large attendance to be cared for at the annual meeting, this and the dinner was postponed until the 14th of June.

Buffalo, N. Y.

The building permits issued during the month of May totalled \$1,568,000, according to the records of the Bureau of Buildings. This is a falling off of \$320,000 from the total attained during the corresponding month in 1912, when the permits for May footed \$1,888,000. Permits for the first week of June indicated a large volume for that month and that the total for the second quarter of this year will exceed that of last.

Permits for the last two months show a larger proportion of dwellings of moderate and medium cost than for some time past; but cover also some residences of high cost, as well as diversified operations in commercial, industrial and municipal structures.

The most important commercial structure among last month's permits is the new bank building to be erected by the Manufacturers & Traders' National Bank at the corner of Main and Swan Streets, to cost \$250,000; steel and granite exterior and marble and bronze interior; 87 ft. in height, of Corinthian design, from plans of the Furness-Evans Company, Provident Building, Philadelphia, Pa.

Other buildings of importance are a theater, store and office building, 120 x 170 ft., at West Ferry and Grant Streets, for the Erie Holding Company, to cost \$100,000; store and office building, Main and West Utica Streets, for the Thayer Syndicate, of Toronto, from plans of Architect Robert A. Wallace, Buffalo, to cost \$50,000; telephone exchange building, Main Street and Fillmore Avenue, for the New York Telephone Company, to cost \$75,000; amusement building, Allen and Franklin Streets, for Stephen V. Conely, from plans of Architects Bethune, Bethune & Fuchs, to cost \$100,000; Public School No. 60 (18 rooms) to cost \$90,000; Lion House, Delaware Park "Zoo," to cost \$100,000; public bath house, Perry Street, to cost \$70,000; apartment house (25 apartments), Eighteenth Street and Richmond Avenue, for the Mathews Realty Company, from plans of Architects Wood & Bradney, to cost \$85,000; also residence and garage on Summer Street for Walter P. Cooke, from plans of Architects Green & Wicks, to cost \$50,000.

Chicago, Ill.

An analysis of building statistics for May shows a 10 per cent decrease in volume as compared with May, 1912. However, the prosperous conditions that have prevailed throughout the first five months have exceeded the same period for last year by 25 per cent.

Permits issued for May, 1913, totaled 1,261, having 33,521 ft. frontage and estimated to cost \$8,925,500. In May, 1912, there were 1,222 permits issued for buildings having a frontage of 34,472 ft. and estimated to cost \$10,373,200. The activities of the building industry have been fairly evenly distributed over the south, north and northwest parts of the city and the progress of construction in the downtown district continues to forge ahead so as to be particularly noticeable.

The preliminary work of construction has been commenced on the main building of the Baldwin Locomotive Works, which is to be 1,150 feet long and 600 feet wide. The plant will be located at Calumet-East Chicago. The contract for the foundation has been awarded Strauss & Co. of Chicago, and grading to A. F. Hartigan & Co.

Arrangements have been completed for the erection of a new seventeen-story hotel at the southwest corner of Van Buren and LaSalle streets, the cost of which is conservatively estimated at \$1,100,000. Holabird & Roche have prepared the plans which call for a steel and fireproof structure supported on concrete caissons extending to bed-rock. The street fronts will have a granite base, and terra cotta from the base to the third story, with brick and terra cotta above.

The southeast corner of Milwaukee and W. North avenues will be shortly graced with a three-story office and mercantile building, 234 x 248 ft., to cost about \$250,000. Holabird & Roche have completed the plans.

George S. Kingsley has completed plans for the new Beebe building, a 13-story structure to be erected at 105-9 N. Dearborn street at a cost of \$350,000. It will be of steel and fireproof construction, fronting 56 ft. on Dearborn street, and will have a depth of 80 ft.

Guggenheim Bros. will shortly erect a three and four story packing house of brick and concrete construction to cost \$110,000. Additional structures to be put up in the stockyards district will be two brick and concrete warehouses for the North Branch Warehouse Co., to cost \$150,000.

Chicago will lose one of its old landmarks when the house of Fernando Jones, at 1834 Prairie avenue, will be razed to make way for a four-story and basement furniture factory to be erected by Herman Altman and Emil

Reinhold. C. A. Eckstrom has prepared the plans for a structure to cost \$105,000.

The Schulz Baking Co. will spend \$250,000 on a new bakery, garage and stable to be erected at Wabash avenue and 55th street. John Aschalager & Sons have been asked to prepare the necessary plans.

The Architectural Club held its annual exhibition at the Art Institute during May, five exhibition galleries being used for the display of drawings of members of the club and also of eminent architects that have been formerly associated with it. There was quite a large representation of public school architecture besides a large number of residence, office building, public building and bank building contributions. In the exhibition of the larger structures the following architects were exceptionally prominent: Marshall & Fox, Cass Gilbert, Jarvis Hunt, George W. Mahr, J. R. Watkins, G. W. Maherach, D. H. Burnham & Co., Pond & Pond, Shattuck & Hammond, Ottenheimer, Stein & Reichert, Purcell, Feick & Elmslie, Frank Chouteau, Lowe & Hallenbacher, Holsman & Hunt, William Eyre, Alfred Alschuler, Allan M. Weary, Ferry & Clas, and Jenny, Mundie & Jensen.

James B. Dibelka, recently appointed State Architect, has moved from 2022 S. 40th avenue to room 640 at 29 S. LaSalle street, where he will occupy spacious offices for the handling of state matters.

Cincinnati, Ohio

The number of permits issued by the Commissioner of Buildings in May was 1215, with the value of the improvements estimated at \$790,572, as against 1290 permits issued for the same period last year, carrying an estimated valuation of \$785,775. In April of the present year 1238 permits were taken out, to cost \$693,205.

Had it not been for labor troubles, this last month would have made a better showing, as weather conditions were excellent for carrying on all kinds of building operations. However, the Building Construction Employers' Association and the Building Trades Council have now signed an agreement that will doubtless end all labor troubles in the building trades for the ensuing 12 months. The elimination of the sympathetic strike was the aim of the employers.

The Builders and Traders' Exchange has moved into its new quarters on Sixth, near Race street. The Exchange occupies an entire floor, which is divided up into executive offices, display rooms for building supply dealers, and a large hall is provided in which general meetings are held.

George W. Welch was recently elected secretary and, assisted by President C. Taylor Handmann, is working hard to increase the membership of the Exchange. A new feature of the membership campaign is a series of monthly "smokers" to which all architects and building contractors will be invited. Stereopticon views will add to the evenings' entertainments, as well as to their educational value.

The Sixth Annual Convention of the National Association of Building Owners and Managers was held at Cincinnati Music Hall June 10 to 13 inclusive. A large number of delegates from all sections of the country were present.

Cleveland, Ohio

New building work in this city continues to come out at a very satisfactory rate. The report of the city building inspector shows that during the first five months of the year permits for new buildings to cost \$7,982,035 were issued. During the corresponding months of last year the new building permits aggregated \$5,536,618.

The number of permits issued during May exceed in number those for the corresponding month a year ago, but there was a slight falling off in value. There were 1,232 permits issued during May for structures to cost \$1,958,025. During the corresponding month a year ago there were 1,095 permits for buildings to cost \$2,014,207.

Dayton, Ohio

It will probably be a month or six weeks longer before there is much activity in new building construction in the city of Dayton. Repair work is progressing rapidly, and it will not be long until most of the outward traces of the flood damage will be eradicated. With the completion of the cleaning up and repair work, opportunity will be had to take up the matter of reconstruction. Practically every one of the buildings destroyed by fire will be immediately replaced by better structures. It is expected that architects will be ready for bids on a number of these buildings within the next two weeks. During the month of May 39 building permits were issued, totaling \$54,825.

Detroit, Mich.

The May number of the bi-monthly magazine issued in the interests of the Builders and Traders Exchange contains the usual quota of matter pertaining to building and to the doings of the Exchange and its members. One

of the principal articles relates to fire hazards and fire prevention, which is a résumé of the remarks of William T. Benallack, manager of the Michigan Inspection Bureau, who addressed the members at the meeting on March 14.

Announcement is made that Will W. Norton has been appointed assistant secretary of the Exchange to succeed George T. Wallace, recently resigned. As a result of a membership contest which terminated March 22, having continued for a period of four weeks, 115 new members were added to the roster, making a total membership of 470. The new uniform blanks for contractors issued a short time ago by the Exchange, one being a "Uniform Estimating blank" for submitting bids and the other a "Uniform Affidavit blank" for furnishing affidavits under the lien law of the state, are meeting with much favor.

In April the carpenter-contractors not affiliated with the then existing Carpenters Association formed a new organization known as the Master Carpenters Association, the officers being: President, Joseph Alfes; vice-president, H. F. Yatzek; secretary, J. A. Whittaker, and treasurer, R. G. McDonnell.

The Detroit Cut Stone Contractors Association was also recently formed, with Edward S. Piggins as president and Henry A. Beebe as secretary and treasurer.

Fresno, Cal.

Fifteen Fresno building contractors met early in May to organize a Builders' Exchange, which has since been incorporated, with a capital stock of \$50,000, by R. E. Blackwell, H. T. Humphrey, E. J. Farr, H. A. Hansen, W. H. Miller and others.

Grand Rapids, Mich.

Secretary W. G. Martin of the Builders and Traders Exchange issued a Monthly Letter covering matters likely to prove of interest to the membership. In his last Letter reference was made to the progress which the Exchange is making and to the efforts to increase the membership. The Exchange has recently installed a table for the filing of catalogues which are so arranged as to be readily accessible to all seeking information and forming ready reference for contractors and builders.

An active building season is expected during the summer and fall, and in addition to new construction work there promises to be a great deal of remodeling and repairs.

Knoxville, Tenn.

The leading contractors in the city of Knoxville have recently formed a Builders Exchange for the purpose of promoting closer relationship between concerns in the city who are in any way connected with the building business. George E. Oldham, who has been connected with the Knoxville Roofing & Paving Company, has been elected secretary of the new Exchange and his offices are at the rear on the first floor of the Board of Commerce Building. Mr. Oldham has been in the building business for about 14 years and has a wide acquaintance among men engaged in that line of business.

Los Angeles, Cal.

Last month's building record is second in value only to that of the previous month, being \$3,735,410, compared with \$2,227,861 for May, 1912. The number of permits was 1499, compared with 1330 for May of last year.

Among the more important buildings for which permits were issued were the south dormitory of the Bible Institute building, thirteen stories, to cost \$230,000; the State armory, to cost \$80,000; and the Sullivan tenement house, to cost \$80,000. Other buildings for which contracts have been let are: an 8-story reinforced concrete building on Broadway between Seventh and Eighth streets, to the Richards-Neustadt Construction Company at \$225,000, and the Metropolitan fireproof building at Broadway and Fifth street, to the F. O. Engstrom Company at \$275,000.

The Dutro-Wren Construction Company, Long Beach, has recently taken two important contracts in that town: a \$250,000 apartment house at Magnolia and West Ocean avenues, and a \$200,000 plant for the California Woolen Mills.

The Los Angeles Builders' Exchange has just occupied a fine new location which it has fitted up on the top floor of the Stimson building. In addition to a large display hall, there are 10 rooms devoted to the Builders' Exchange itself, with 21 rooms for the use of material dealers. The Exchange had planned to put up a building of its own, but decided that the present quarters were adequate, and has taken a 10-year lease on the floor.

Newark, N. J.

While there was a less number of new buildings planned in Newark last month than was the case in the same period a year ago, the amount of money involved was nearly \$400,000 greater. According to Superintendent O'Rourke there were 305 permits issued last month

for construction work calling for an expenditure of \$1,683,705, as contrasted with 317 permits which the department approved in May, 1912, for buildings to cost \$1,290,469.

The month of June starts out well with 26 permits granted the first week for new construction work, alterations, etc., estimated at about \$200,000.

A petition requesting that no license be granted for a moving picture theatre in the city unless the location of the building is eight city squares away from an existing theatre has been presented to the License Committee of the Common Council.

New York City

The striking feature of the local building situation during the month of May was the very heavy shrinkage in the amount of new construction work projected as compared with the corresponding month of last year. This is more noticeable, perhaps, in the class of buildings intended for use as stores and lofts, although it is marked in office buildings, manufactories, and workshops. In fact, there was a gain in only three classes of operations, these including garages, tenements and amusement places.

According to the figures of Superintendent Rudolph P. Miller of the Bureau of Buildings for the Borough of Manhattan, there were issued 83 permits for new buildings costing \$4,319,275, while in May last year permits were taken out for 95 new buildings estimated to cost \$12,646,375. Store and loft buildings show a decrease of 8 in number, as compared with a year ago, and \$5,361,000 in cost; office buildings show a decrease of 6 in number and \$1,357,000 in cost; factories a decrease of 8 in number and \$1,031,000 in cost; schoolhouses a decrease of 3 in number and \$562,000 in cost, and churches a decrease of 1 and \$225,000 in cost. Of tenements, plans were filed last month for 25 costing \$2,295,000, against 10 in May last year costing \$1,466,000.

Last month alterations to the amount of \$1,607,269 were authorized, as against \$1,104,373 in May a year ago.

The records of the Chief Inspector of amusement places show that up to the end of May this year there were in Manhattan 113 regular theatres and 6 under construction; also 227 interior moving picture and 38 open air moving picture shows. The total number of places of amusement in Manhattan is given as 384.

Among the more prominent apartment houses for which plans have been filed are a 10-story structure 90 x 125 ft. to be erected at the corner of Cathedral Parkway and Lenox avenue to cost \$500,000. It will have a facade of brick and limestone and accommodations for 86 families. The architects are Neville & Bagge. The same architects have completed plans for a 12-story apartment house in West 81st street to cost \$300,000.

Plans have also been filed for a 12-story apartment house to be erected at the corner of Lexington avenue and 72nd street to cost \$250,000; also for a 12-story apartment house, 100 x 82 ft. in plan, to be erected at 86th street and Park avenue to cost \$500,000. Schwartz & Gross being the architects in both cases.

In the Bronx, according to the report of Superintendent James A. Henderson, 106 new buildings were planned in May to cost \$3,124,550, while in May last year 133 new buildings were planned to cost \$4,140,495. Including alterations, the total figures for the two periods are \$3,247,934 and \$4,303,269 respectively.

One of the most important projects is a \$400,000 theatre at the corner of Crotona Parkway and Elsmere place with a seating capacity of 2500, the plans for which were filed early in June. The building will have a frontage of 109.8 ft. and a depth of 206.4 ft. and will be 2 stories high, with a mezzanine floor. The facade will be in the French Renaissance style of architecture with marble, granite and terra cotta.

In Brooklyn there was also less activity in May than was the case a year ago, this being particularly noticeable in the falling off in dwelling house construction. Superintendent P. J. Carlin of the Bureau of Buildings reports that last month 322 new structures were planned to cost \$2,525,185, while in May a year ago 663 new buildings were planned involving an estimated outlay of \$4,398,058. Alterations, additions, etc., make the totals for the two periods \$3,091,270 and \$4,722,274 respectively.

Among the more important operations under way in the vicinity of Borough Hall, Brooklyn, is the 12-story office building rising on the corner of Court and Joralemon streets, and which in modern appointments will be one of the best commercial structures in Brooklyn. It has a frontage of 63 ft. on Court street and a depth of 100 ft. on Joralemon street. The cost is estimated at half a million dollars. The first three stories will be of Indiana limestone with buff brick and terra cotta above.

Another improvement in this section is the 16-story office building to cost something over \$900,000 which will rise on the site of the old Academy of Music.

One of the largest suburban projects in view has to do with the Mapleton Park section where 500 one-family brick residences are soon to be erected. These are in addition to 50 which have already been built.

Oakland, Cal.

The building report for May reflects considerable activity, the total valuation being \$1,282,145, compared with \$635,176, though some decrease is noted from the corresponding month of last year, when permits were issued to a valuation of \$1,304,734. The number of large buildings is somewhat larger than usual, the more important structures for which permits were issued being: the Carlston & Snyder building, 12 stories, Class A, to cost \$250,000; the 10-story Class A Lucy Thompson building at Seventeenth street and Broadway, to cost \$155,000; and the 6-story Class B Robert Dalziel building on Fifteenth street near Clay, to cost \$137,260. Aside from this, contracts are now being let on the municipal auditorium, the final award for steel work going to Dyer Bros., San Francisco, at \$177,000.

Dwelling construction has been quite active for the last two months, but some curtailment is noted owing to the difficulty of obtaining money for speculative work in this line. Contractors who have good financial resources are disposed to go ahead, but some of the smaller operators have decided to wait until the financial situation is easier, or until they can sell off the houses already built.

A commission of three, consisting of W. T. Veitch, building contractor; Henry Schulz, architect, and John B. Leonard, engineer, has been named to work in conjunction with Building Inspector Towle and Fire Chief N. A. Ball to revise the building ordinance and extend the fire limits.

The competition for plans for the \$1,000,000 Alameda county infirmary has been closed.

Fluth & Morton have taken a contract for the construction of a \$60,000 Elks' hall at Richmond, Cal.

Philadelphia, Pa.

While building operations in May were not particularly heavy, the volume was close to the average for that month in the past ten years. The continued decline in dwelling house construction is still the factor, the building of apartment houses having detracted to some extent from dwelling operations. In 2-story dwellings the estimated cost the first five months amounts to \$5,051,090 as compared with \$5,062,720 for the same period in 1912. General building operations during the first five months of 1913 aggregate \$17,047,595 as compared to \$15,486,470 in 1912.

General statistics for May, as compiled by the Bureau of Building Inspection, show 1472 operations were authorized at an expenditure of \$4,170,090, as compared with \$3,996,785 in May, 1912. Permits were taken for 466 2-story dwellings at an estimated cost of \$1,085,575 as compared to \$1,631,430 in April, at the same time permits were issued for one tenement house costing \$30,000 and two apartment houses costing \$1,008,000. Manufacturing buildings, shops and engine houses contributed \$175,350, garages \$16,960. Places of amusement costing \$330,000 were authorized, while hospitals, churches and clubs contributed a total of \$228,000. New building work continues in fair proportion. Architects have a large amount of work on the boards and the outlook for an active year is very favorable.

Builders have been handicapped to some extent during the past month by labor troubles. In several branches of the trade strikes have been on but have not been serious.

Probably the largest single building proposition in immediate sight is that of the addition to the Ritz-Carlton Hotel for which detailed plans and specifications have been practically completed by Horace Trumbauer, architect. The addition will conform with the present building and will involve the expenditure of about \$1,000,000.

A large dwelling house operation covering the erection of 95 2-story brick and stone houses at Eighth, Ninth, Luzerne and Wyoming streets will cost about \$250,000. Gorman & Marshall are reported about ready to begin work on 112 2-story dwelling houses on Angora avenue, between 56th and 57th streets. An operation of 34 dwellings has been started by Frank W. Platt on Media street, west of 54th street, which will cost upwards of \$100,000.

The Bureau of Building Inspection has made a ruling on the use of concrete foundation work in connection with dwelling houses, replacing stone and mortar. Briefly, specifications calling for a 12-in. wall of concrete to support a 9-in. brick wall on a 16-ft. spread, and a 16-in. concrete wall to support a 13-in. brick wall on an 18-ft. spread. Centering must be used on both sides of the concrete wall, it not being permissible to use the bank for this purpose. All concrete must be of good Portland cement and stone, either trap rock or limestone. This ruling was authorized in order to overcome delay in building work by strikes on the part of stone masons.

Pittsburgh, Pa.

The formal opening of the new quarters of the Pittsburgh Builders' Exchange was held in its new headquarters in the Fulton building, on June 11, arrangements for the affair having been made by E. M. Tate, the recently elected secretary.

The meeting was attended by about 100 members of the building trades of the city who enjoyed a luncheon and listened to an interesting discussion on municipal affairs by Robert Garland, member of the city council, who discussed the efforts of the Efficiency Commission to improve conditions in municipal government and the relation of the building trades to civic improvement.

The scope of improvement in the work of the Builders' Exchange was outlined in brief addresses by H. L. Kreusler, Scott A. White, Joseph A. Weldon, John A. Straus, W. T. Heppenstall, S. M. Murphy and Robert K. Cochran, president of the Exchange.

Secretary Tate, who had been secretary and business manager for the Master Plumbers' Association of Allegheny county for several years, announced that meetings will be held weekly on Wednesdays at 12:30 o'clock, at which luncheon will be served and subjects of interest to the building trades will be discussed by prominent speakers identified with building interests. A "change hour" has been established from 11 to 12 o'clock daily, during which bulletins or building operations will be posted and an opportunity afforded for contractors and clients to meet and discuss matters pertaining to construction work.

Portland, Ore.

The total valuation of building permits for May was \$890,180, while the total for May, 1912, was \$1,622,276.

One of the largest contracts recently let was for the 8-story Trimble building, to cost about \$100,000. The general construction will be by Boyajohn & Arnold.

Considerable criticism has lately been aroused by the granting of special building permits by the city council, by which various provisions of the building code are nullified, and the work of the building department interfered with. It is noted that the number of special permits, which was closely held down in former years, has increased greatly, being 24 in 1912, and 14 in the first four months of 1913. The result is that a good many buildings do not comply with the code, and there is a growing tendency to build with little regard for legal restrictions. Complaint has also been made of confusion of jurisdiction between the engineering, police and building departments, leading to much laxity in enforcement of the laws.

Richmond, Va.

The May report of Building Inspector Butler shows the estimated cost of the new work authorized to have decreased \$235,557 as compared with May last year, while alterations and repairs for last month show an increase of \$21,178. By way of explanation it may be stated that the report does not include building operations in the suburbs where residences ranging in cost from \$1,000 to \$50,000 have been placed under contract since the first of the year to an amount approximating one million dollars.

For the first five months of the fiscal year the total building operations authorized amounted to \$2,310,106.

Sacramento, Cal.

The building situation is quiet, last month's record being the lowest in nearly a year and a half. The valuation of buildings for which permits were issued in May was \$103,012, compared with \$210,427 for the previous month, and \$262,174 for May of last year. No new work of importance has come out, and about the only really large buildings planned are of a public nature.

For the Capital School building, the city commissioners have decided on reinforced concrete construction, at an estimated cost of \$188,000. Plans are being drawn by Shea & Lofquist, San Francisco.

The Sacramento Valley Exposition Commission has adopted plans for a building to cost about \$250,000 for the Panama-Pacific Exposition in San Francisco.

The steel contract for the Gottschalk Department Store, Fresno, Cal., has been let to the Central Iron Works, San Francisco. Bids have been received for a \$35,000 building at I and Kern streets, Fresno, G. Mathewson, architect.

San Diego, Cal.

The curtailment of the citrus crop is apparently having some effect on building conditions, as the official valuation dropped from \$776,850 in April to \$385,995 in May, the lowest record since July, 1911. The abruptness of the drop is still more apparent in view of the fact that the March total was unusually high, being \$1,897,998: while

the record for May, 1912, was \$803,984. Considerable work is in preparation, however, and contractors look for some improvement within the next month. The principal building for which a permit has been issued lately is the 6-story brick and steel hotel of the Sefton Investment Company, to cost \$250,000. Plans have also been filed for a \$100,000 4-story brick hotel at Fifth and A streets.

San Francisco, Cal.

Permits were issued in May for buildings valued at \$1,728,244, compared with \$2,229,423 for May of last year. Notwithstanding the decrease in official figures, current activity is still increasing, owing to the large number of contracts let on the Exposition, and the beginning of structural work on some of the larger buildings formerly contracted. New work now coming out includes many small business buildings, as the last of the temporary shacks built after the fire are now being torn down and replaced with permanent structures. Aside from this, there is some increase in dwelling construction, due to the opening of several new tracts in the western and southern parts of the city.

In supervising the construction of the 10-story Insurance Exchange building, Willis Polk & Co., architects, posted a chart in a public position in front of the building, giving the name of each contractor and showing graphically when each part of the work should be completed. The steel, concrete and fireproofing contracts have been completed three weeks ahead of the schedule, and other contracts have progressed beyond the point specified for this time. The co-ordination of the work so that no part should interfere with others involved an elaborate organization, and those in charge of the various departments hold daily conferences to lay out the next day's work. Frequent reports are received showing the location of every lot of material ordered, so that everything can be on hand when needed. The posting of the chart in front of the building has attracted wide attention, and caused much speculation as to whether the various parts of the work would be finished on time.

The market for brick, lime, cement and other concrete materials is quite firmly held, with a large and growing demand, and a heavier business in these materials is expected than for several years past. In other materials, however, the situation is becoming a little easier. Deliveries of structural shapes are coming through in better time, and there is no longer any difficulty in getting reinforcing bars, some sellers showing considerable anxiety for business. The retail lumber business is active, but freight rates from the northern mills have dropped about \$1 per M. in the last two months, and prices at the mills are falling off.

Seattle, Wash.

While there were a few more buildings planned in May than was the case in that month last year the total amount of vested capital involved was a trifle less. There were more frame buildings planned last month and the number of detached residences for which permits were issued showed a slight gain over a year ago, but the situation has developed nothing of a startling nature. According to the report for May of R. H. Ober, Superintendent of the Department of Buildings, there were 919 permits issued for building construction estimated to cost \$683,380, while in the corresponding month last year 875 permits were issued for construction work valued at \$738,110.

There were two buildings of a semi-fireproof nature for which permits were issued last month costing \$57,000 as against five costing \$268,000 in May a year ago. Of detached residences 170 were planned last month costing \$353,175 and in May last year 165 were planned costing \$248,760.

For the five months of the current year 4,078 permits were issued by the department of buildings calling for an outlay of \$4,322,160, these figures contrasting with 4,256 permits issued in May last year for work to cost \$4,071,075.

Washington, D. C.

At the annual meeting of the Builders and Manufacturers Exchange of the District of Columbia, held June 2, the following officers were elected for the ensuing year:

President.....Chas. A. Langley.
First Vice-President.....W. T. Galliher.
Second Vice-President.....Thos. W. Smith.
Third Vice-President.....E. R. S. Embrey.
Treasurer.....Frank L. Wagner.
Secretary.....Charles E. Welsh.

On the 15th of April the Exchange moved to its present location, 1220 New York Avenue, N. W., where it occupies the entire building. The first floor is devoted to Exchange offices, exhibits and desk spaces which are rented to those engaged in various branches of the building trades.

BUILDERS' APPLIANCES AND EQUIPMENT

Some Things of Seasonable Interest to Those Having
to Do with the Building Business

Gas for the Country Home

Gas for country homes has generally been considered a luxury to be indulged in only by the wealthy. A man of ordinary means living in the country or small town is now able to install a lighting plant which it is claimed will provide light cheaper than any other form of illumination. Such a gas lighting outfit designed in particular for country home lighting is being manufactured by the Detroit Heating & Lighting Company, Detroit, Mich. A large number of these plants have been installed, and it is claimed that they give entire satisfaction.

The Detroit outfit is a combination gas machine and

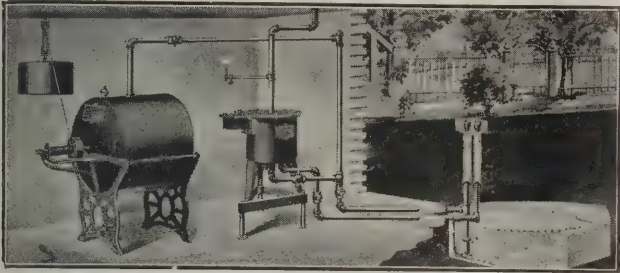


Fig. 1—Gas for the Country Home—The Detroit Gas Outfit

automatic mixing regulator. The lighting machine is placed in the basement, and the fuel, which is gasoline, is not stored in the house but in a large carburetor which serves as a storage tank, and which is placed in the ground at some distance from the house, so that there is no danger from the use of gasoline. None of the gasoline enters the house. The only attention that the machine requires is that it must be wound up once or twice a week. In addition to this the carburetor has to be filled with gasoline at long intervals. An important feature of the machine is the automatic mixing regulator that keeps the gas uniform in quality and always ready to give a white and clear flame free from smoke and odor.

In addition to furnishing gas for lighting the machine gives a fuel that can be used in a gas range for cooking or in connection with a gas hot water heater so that a constant supply of hot water can always be had. Every housekeeper will appreciate the convenience of having gas to use for these purposes. A view of the outfit is shown in Fig. 1.

Gasoline from 80 to 86 test is usually used, which costs about 20 cents a gallon. About 5 gal. of gasoline is required to produce 1000 ft. of gas. It is stated that this 1000 ft. of gas will maintain an 80 candle power burner equipped with a mantle for 400 hours, making the cost of the burner about $\frac{1}{4}$ cent per hour or less, which is claimed to be lower than the cost of any other form of lighting.

It is stated that the Detroit combination gas machine is constructed of material that under fair conditions will last a life time, that no repairs are required under ordinary usage and that all insurance companies will insure the premises at the same rate as if coal gas were used. The mechanism of the machine is noiseless when in operation. Its winding gear enables the operator without the assistance of another person to wind up the weight while the lights are burning without affecting them. The gas is suitable to run a gas engine and dynamo for the purpose of lighting a residence with either gas or electric light or both combined. The installation of this system requires the piping of the residence in the same manner as the city home that uses artificial coal gas. While the purchaser may install his own piping, it is recommended that this work be done by a plumber or gas fitter.

The company has issued a booklet entitled "Gas for the Country Home," which it will be glad to send to any one interested. It will also furnish complete estimates of the cost of gas and machines and other information desired.

New Plant for Production of Universal Portland Cement

The Universal Portland Cement Company has commenced work on construction of Plant No. 7 at Duluth, Minn. It will involve an outlay of about \$1,700,000 and will have an output of 1,400,000 barrels of Universal Portland cement per annum. The plant will be electrically operated throughout requiring about 5,000 h.p. It is expected that it will be in operation some time next year. The new plant with those at Chicago and Pittsburgh will give the company a total output of 45,000 barrels a day or about 13,500,000 barrels a year. The shipments of Universal Portland cement in 1912 are said to have been 10,047,499 barrels. It is interesting to note that in 1900 the company's output was 0.39 per cent of the total production of Portland cement in the United States, while in 1912 the company's output was 12.34 per cent of the total.

The New "American" Bench Jointer

A new bench jointer which has been designed for a great variety of small work and which will be found an especially useful tool for the woodworking shop of the carpenter-contractor as well as for pattern shops and manual training schools, is illustrated in Fig. 2 of the engravings. It is fitted with ball bearings and round head and the claim is made that it will do up to its capacity what any other joiner will do. It is made by the American Woodworking Machinery Company, Rochester, N. Y., and with sales offices in many of the leading cities of the country. The frame is a single heavy casting with inclines at both ends upon which the tables move. The tables are each a single casting fitted with adjusting screws for the cut and clamping levers to secure rigidity on the frame. The guide or fence is secured to the rear table so as not to interfere with the adjustment of the long table to the cut and it may be tilted to 45 degrees or any intermediate position and rigidly clamped at any point. A motor-drive can be furnished if desired. It occupies a



Fig. 2—The New "American" Bench Jointer

floor space 41 x 18 in. and carries tight and self-oiling loose pulleys 6 x $3\frac{3}{8}$ in. running at about 800 revolutions per minute.

A comprehensive idea of the extent to which machine tools may be made to assist the woodworker can be gained from the new catalogue which the company has just issued in the shape of a handy edition. Its 317 pages present a detailed description of the extensive line of woodworking appliances manufactured by this concern, including band-saws, lath mills, gang edgers and rippers, circular rip saws, double cut-off saws, saw benches, timber

sizers, matchers, surfacers, glue jointers, buzz planers, moulders, etc. The description of each machine is accompanied by a well executed half-tone engraving and data is given relative to the floor space occupied, the weight, and other necessary facts. The company states that it has on hand at its various sales departments large illustrated circulars, as well as the large general catalogue made up in sections, so that literature descriptive of a complete line of machinery to suit various requirements can be compiled and mailed promptly. Special catalogues are also issued in the German, Spanish, Italian and Scandinavian languages.

Perfection Belt-Drive Grinder

A new design of belt-driven grinder especially adapted for use in small shops and by farmers and others making

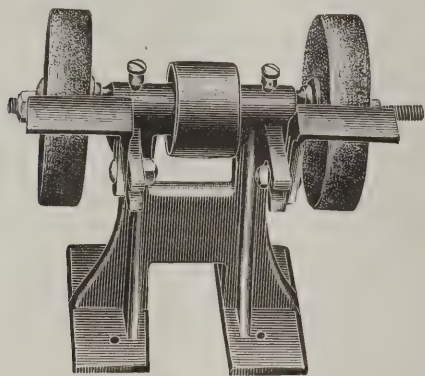


Fig. 3—The "Perfection" Belt-Drive Grinder

use of a gasoline engine as motive power is the tool illustrated in Fig. 3 of the engravings and which is being placed on the market by the El Starr Mfg. Company, Milwaukee, Wis. The tool is of such a nature that it may be operated by a belt either direct from a gasoline engine or other power or from a line shaft. It has convenient adjustable tool rests, brass oil cups and all bearings are capped and babbitted. The pulley measures 3 x 2 in., and the grinder is fitted regularly with two 7 x 1-in. corundum wheels—one fine and one coarse. The claim is made that this tool will do work many times quicker than it can be done by means of a grindstone; in fact, as the company puts it, the machine will do two days' work in one hour.

The Abrasive Age

Just now it seems to be much the vogue for enterprising industrial concerns to issue what may be termed "house organs" in which the merits of their particular specialties are presented in a way to strongly appeal to those readers among whom the publications in question are distributed. One of the latest of these is "The Abrasive Age," devoted to the better use of abrasives and published by the Carborundum Company, Niagara Falls, N. Y. In its latest issue much interesting and valuable information is given touching the manufacture of frictionless bearings wherein the methods used in the production of ball and roller bearings are described, also the grinding which is an important operation in this industry. Another article of interest is on plate glass beveling, while a third deals with the "Three-Drum Sander." Half-tone illustrations are scattered through the issue, all tending to facilitate a better understanding of the methods described. Not the least interesting feature are the comments on the Carborundum clip and gouge stones made by the Carborundum Company, reference being made to the fact that these will be found of particular interest to the carpenter, cabinet maker and pattern worker, whose tools must necessarily be kept in prime order with keen cutting edges in order to do the work with celerity and despatch and at the same time with a degree of workmanship which will render it in every respect satisfactory.

Advantage of Installing Sliding Doors in Preference to Plain Cased Openings

One of the important articles in the last number of "Door-Ways," the house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill., is the announcement that the prize contest for the best 200-word article on the advantages and conveniences of installing sliding doors in the modern home is to be continued to the first of July. It seems that in announcing the contest originally the company omitted going into detail regarding what it believed to be a very important feature, namely, "the advantages of

installing sliding doors in preference to plain cased openings." The company expected that those who entered the contest would embody in their articles reasons exploiting the advantages of sliding doors in preference to plain cased openings as well as reasons for the substitution of sliding doors for swinging doors. In reading over the articles submitted, however, "the advantages of substituting sliding doors for swinging doors" was found to be the only subject discussed and the company could not understand why the advantages of sliding doors in preference to plain cased openings were so entirely overlooked, unless the original announcement of the contest led contestants to believe that "sliding doors vs. swinginw doors" was the main subject. The contest is therefore to be continued until July 1 in order to allow those who have already submitted their articles ample time to revise them if they care to do so. In case a contestant feels he cannot improve his article by a revision of it the company assures him that the article will not be slighted when it is judged, but will be accorded the same careful consideration as the rest.

One of the illustrated articles deals with the business career of Superintendent P. L. Hoffman, who entered the employ of the old Wilcox Company in 1896. Other illustrated matter includes Overhead carrying systems, the new Bingham building at Cleveland, and reference to various door hanger specialties.

Rex-Tile Shingles

Among the newer products offered to home builders and which therefore are of special interest to architects and contractors is the shingle known as "Rex-tile" and made by the Flintkote Mfg. Company, Boston, Mass. These shingles are made of wool felt base, thoroughly saturated with special waterproofing compounds, then coated with a thick elastic outer skin which is said to possess waterproof, weather-proof and fire-resisting qualities. Their beautiful colors—red or slate—are a part of the roofing, not merely a mineral surface coating, and are claimed to be absolutely permanent. The shingles are all of exactly the same size, measuring 8 in. in width by 18 in. in length and are laid 5 in. to the weather.

The lower end is folded under 2 in. by a special process in manufacture. This fold is for nailing and gives the thick effect at the butt end. The nailing at the butt end eliminates the annoying curling feature, and the claim is made that Rex-tile shingles will not warp, crack or split. Rex-tile is laid in single pieces in the same manner as wooden shingles beginning at the eaves. The first course is laid double in the usual way, always nailing through the bent-over end, as shown in Fig. 4 of the illustrations. After this course lay the second and additional courses in exactly the same way as the carpenter lays wooden shingles, always nailing through the bent-over end, which not only fastens the lower or butt end of the shingle, but also secures the upper portion of the two preceding

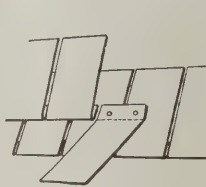


Fig. 4

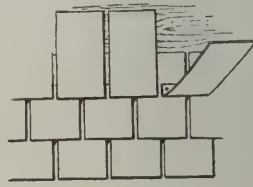


Fig. 5

Rex-Tile Shingles—Showing Method of Applying Them

courses, as indicated in Fig. 5. At the ridge simply carry over by bending the last course of each side and then finish off with a long ridge strip cut from a Rex Valley Strip and nail securely. Rex Valley Strips are made of the same materials as the shingles and should be used for gutters, flashings, etc. The point is made that as the Rex-tile shingles weigh only 140 lb. to the square they do away with heavy roof construction. Reference is made to the durability, attractiveness, uniformity and permanency of color and to the fact that the cost of Rex-tile shingles is within easy reach of the average builder.

Schoedinger's Universal Lock-Joint Construction

We have just received from F. O. Schoedinger, Columbus, Ohio, a copy of a very attractive catalogue illustrating and describing what is referred to as "something new in the metal ceiling line both in construction and design." It is pointed out that erectors of metal ceilings will welcome a product which requires no cross furring and no cross nailing and one which in no case requires the furring strips to be placed 6 in. apart as is necessary in many lap joint patterns. In Schoedinger's Universal Lock-Joint

Get Our Quotations On Building Materials

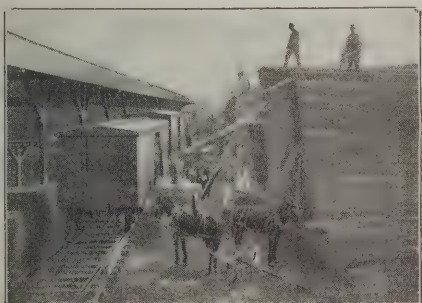
Gordon-Van Tine Co.'s Latest Catalog Offers Train-Loads of Building Material



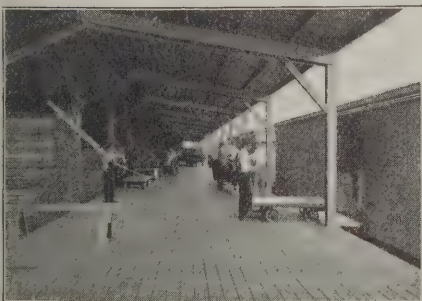
A Corner In Our Woodworking Shop



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The quotations on building material in our new catalog are so far below local prices that every builder who consults his pocket-book should certainly write for it *at once*. The quotations now in effect apply to everything required to put up any building from a modest cottage or bungalow to a palatial residence.

We have furnished all the material for more high-grade homes than any other single concern in America.

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The facilities of our mill work plant and warehouses, together with our splendid organization, enable us to give building contractors and carpenters a service that cannot be duplicated elsewhere.

Our stocks cover every possible requirement and offer an almost unlimited variety of exclusive designs. Our arrangements for rapid and accurate handling of orders are absolutely perfect.

The result is that our thousands of regular customers in the building trade have learned that we ship exactly *what* they order, and that *the goods are there on time*.

Some of Our Specialties

We make a specialty of fine designs in *Oak Front Doors*, many with art glass set in copper. Some of these doors, which we sell for \$7.75 to \$12.50, would cost the contractor as high as \$25.00 if made to special order at a local mill.

We offer many beautiful styles of Oak Interior Finish and Trim, with extremely artistic doors and windows to correspond.

Our architects and designers have given us a wealth of exclusive styles in Stair Material, Porch Work, Mantels, Grilles, Built-in Buffets, Beam Ceiling, French Windows, etc., all of which we *carry in stock*, for immediate delivery, and sell at a fraction of the prices demanded for similar goods by local planing mills.

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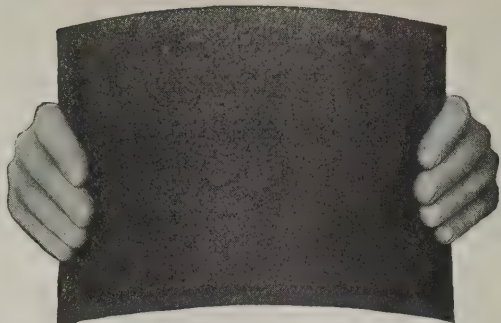
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WITH usual roofing materials it is impossible to produce such a unique, attractive roof as that illustrated below. But with Reynolds *Flexible Asphalt Shingles* roll edges, thatch effects and rounded corners are easily made. Such a roof adds real distinction to a well-designed, well-built home, whether modest or most pretentious.

The fact that Reynolds Asphalt Shingles may be bent to any required form does *not* imply that they are flimsy or soon destroyed. On the contrary, *they last longer than wood shingles*. They cannot warp, split, crack, curl, drop or blow off. For ten years sun, snow, rain, hail have failed to impair their usefulness or beauty. This severe test has been conducted right here in Grand Rapids, where climatic changes are most severe.

Furthermore, Reynolds Asphalt Shingles are a real protection against fire. Flying sparks cannot set them ablaze. *They save part of your insurance cost.*

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Guaranteed for 10 years—
will last many years longer

Rough surfaced weather defiers made of crushed slate or granite securely embedded in pure asphalt. Natural colors of garnet, red or gray-green which *never fade and never need painting*. We are the original makers of flexible asphalt slate shingles and tested them for ten years before putting them on the market. They are uniform in size—8 inches by 12¾ inches—and are laid 4 inches to the weather. Write for the name of our nearest distributor.

Let us send you a booklet showing
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roofed with Reynolds Asphalt Shingles—signed opinions of the owners are included. Also opinions of leading architects and builders. Write for a copy TO-DAY.

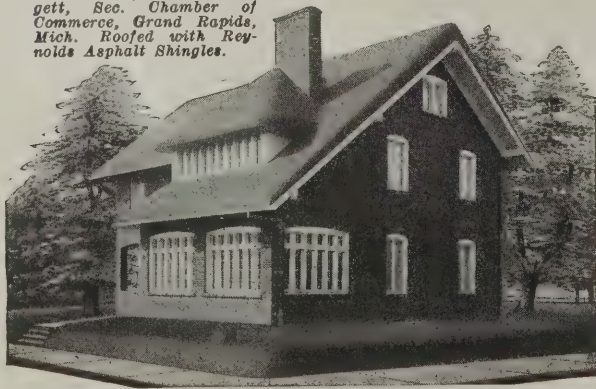
H. M. Reynolds Asphalt Shingle Co.

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Members National Builders' Supply Association.

Residence of M. O. Huggett, Sec. Chamber of Commerce, Grand Rapids, Mich. Roofed with Reynolds Asphalt Shingles.



Construction, the panels and plates are tongued and grooved on all four sides so that all nailing is concealed from view and all joints made permanently tight. The fillers and moldings also lock into the panels and plates and also into each other, this being referred to as a "valuable and labor-saving feature." In illustrating the product of Mr. Schoedinger only one design is shown on a page and as the latter measures 13½ in. in length by 10 in. in height, the detail is brought out with great clearness, thus giving the architect, the builder or the sheet metal man having a copy of the catalogue before him an excellent idea of the patterns involved. In the case of the sheet metal panels, center pieces, cornices, fillers, etc., several designs are presented upon a page and all clearly printed in a way to strongly appeal to the eye. Not the least interesting feature of the catalogue is found in the directions for erecting these lock joint metal ceilings. The last page is devoted to Schoedinger's Tubular Fireproof Metal Window Frames and Sash which have created much interest among architects by reason of their peculiar weather proof qualities. An elastic galvanized iron tube covered by another of corrugated brass is forced into the circular opening between the sash and face of the frame and constitute a compound metal weather strip which is claimed to effectually prevent wind, weather, dust, smoke and fire from entering the building. The tubes are secured in place by small adjustable lugs so that they become an integral part of the sash and lift up and down with it.

"Leader" Double Acting Hand Pump

A very attractive display card which is being distributed to the trade by the Leader Iron Works, Decatur, Ill., beautifully illustrates the Leader Double Acting Hand Pump which is used in connection with the Leader system of water supply. The card itself, of which a reduced illustration is found in Fig. 6, measures 13 x 10 in. in size and the various parts of the pump are shown in colors.

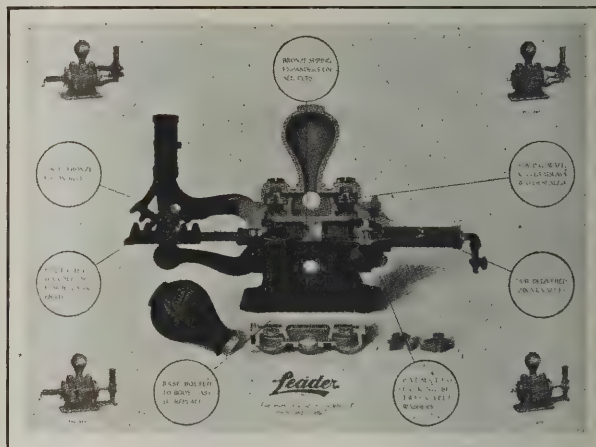


Fig. 6—"Leader" Double Acting Hand Pump

An examination of the picture discloses arrows leading to some of the more important parts with a clear indication of what these consist. In the upper right hand corner is a small picture of a Leader hand pump with cog gear handle and air intake valve; in the lower right hand corner is shown a pump with lever handle and air intake valve; in the lower left hand corner is a pump with lever handle and air compressor, and in the upper left hand corner is shown a Leader hand pump with cog gear handle and air compressor. The card is a beautiful example of the printer's art and the make-up is such as to admirably serve the purpose for which the card is intended.

Influence of Copper on Corrosion in Metal Roofing

Of late years much thought and many experiments have been devoted to attempts to produce a metal roofing with maximum resistance to corrosion by either weather or atmospheric conditions. There is always a great deal of interest shown in any improvement that will secure the desired result, and in experiments conducted with this end in view. In this connection a very interesting paper was recently read before the American Chemical Society, at their annual meeting held recently at Milwaukee, Wis., by D. M. Buck, Chief Chemist of the American Sheet & Tin Plate Company, of Pittsburgh, Pa. Mr. Buck gave full details of some instructive experiments, extending over a number of years that were made with metal roofing sheets made from ordinary steel, and also sheets to which copper had been added. The exhaustive treatment was

(Continued on page 44)



Stanley's Ball Bearing BUTTS

SOLVE THE PROBLEMS OF HANGING DOORS

The Ball Bearing Washers eliminate friction and permit the door to swing smoothly and softly without creaking or binding.

The bearings will never wear down or require oiling.

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The Butts are made in all sizes and in any finish desired.

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Write for our handsome booklet, "Properly Hung Doors." It contains much information of value to the builder.

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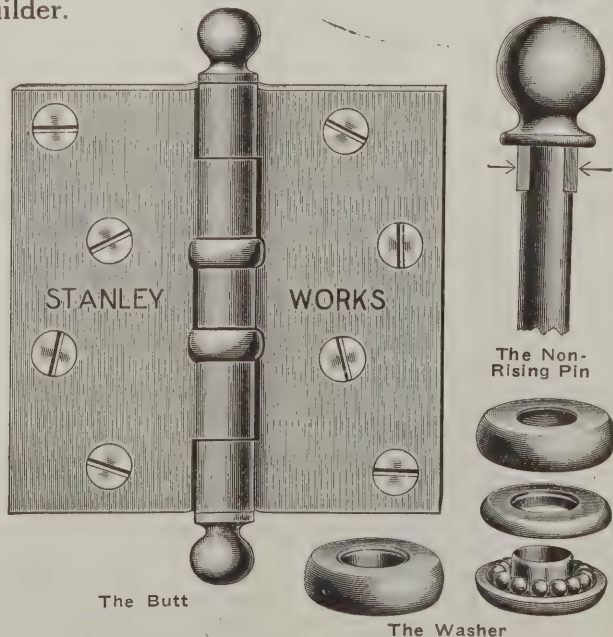
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And that's not all. You'll have a better and more lasting job because BRIDGEPORT STANDARD PREPARED PAINT is scientifically prepared from the "formula to the can."

Hand mixed is another name for imperfect paint; imperfect because the keg and paddle cannot do the work of modern machinery.

BRIDGEPORT STANDARD PREPARED PAINT is *built*, not made. Every process—every ingredient has a relation to the perfect whole; adds to its goodness, covering properties and durability.

The first "dip" of the brush makes apparent its goodness; a few strokes shows up its great covering capacity—and time has already proven its exceptional durability.

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Sole Manufacturers

The Bridgeport Wood Finishing Co., New Milford, Conn.
NEW YORK CHICAGO BOSTON

conducted with extreme care in a practical manner, leaving nothing to chance or conjecture, so that the results obtained are authentic and dependable. The object was to establish the relative value of small amounts of copper in metal roofing when exposed to natural corrosion under varied atmospheric conditions.

Actual service tests were made in the Pennsylvania coke regions, where the air is impregnated with sulphuric acid and other corrosive fumes; on the seacoast, where the air is charged with sodium chloride, and in a rural section where the air is pure and free from added corrosive agents. At each location a skeleton wooden building was erected and roofed with corrugated metal sheets containing different proportions of copper. The sheets were not protected by paint or any other coating except, of course, the thin film of oxide always present on an annealed sheet. Accelerated acid tests were also made on segments taken from the same sheets. Caution was taken so as to insure that the findings were definite and convincing.

Excellent results were obtained, which showed conclusively that in every instance the roofing which contains copper lasts much longer and gives far better service than sheets without copper. The difference in the atmosphere at the various testing stations produced interesting data of much value in deciding the correct amount of copper to be used. After long research and much experimenting the American Sheet & Tin Plate Company has, in view of the success of the new treatment, adopted copper bearing steel exclusively for roofing tin. This represents a very important step forward in the tin roofing business. Copper bearing steel can also be furnished in both black and galvanized sheets.

Mr. Buck's instructive address, liberally illustrated with photographs of the tests, and with valuable tables, has been published in book form. The information given on this new departure in the making of metal roofing and siding will be of much value to builders and others who are interested in securing more durable roofing tin and sheets for roofing and siding purposes. A copy of the book can be secured by addressing the American Sheet & Tin Plate Company, Frick Building, Pittsburgh, Pa.

Attractive Mantel Designs

In our last issue we referred to the very handsome catalogue of wood mantels which had just been issued from the press by the Huber Builders' Material Company, 48



PLASTERGON
TREATED WOOD FIBRE
WALL-BOARD

Plastergon Money Is Easy Money for the Builder

because it is a profit which the other fellow always got until Plastergon superseded lath and plaster.

Plastergon Makes a Better Wall Than Lath and Plaster

and the builder can shade the plasterers' price enough to bring the job into his contract.

There are no "come-backs" with Plastergon, either.

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to give absolutely satisfactory service.

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Warm in Winter and Cool in Summer



Fig. 7—Attractive Mantel Design Executed in Quartered Oak

and 50 Vine Street, Cincinnati, Ohio, and at this time we take the opportunity of presenting to the attention of our readers one of the many handsome constructions therein indicated. The design is intended to be executed in quartered oak, golden finish, polished, or it may be had in any style of Mission finish. It is 6 ft. 1 in. in height and 4 ft. 10 in. wide. The wall plates are 5 ft. and the pilasters 6½ in. in width. The tile opening is 42 x 42 in.

It will be seen from an inspection of Fig. 7, which represents a front elevation of a wood mantel that it has a wide panel above the shelf and its general character and design is such as to make it a very attractive piece of furniture for the home. Instead of the wide panel just above

(Continued on page 46)

A Hanger for any Door That Slides

"Every
Hanger a car."

For years the R-W line has borne the enviable distinction of being the largest, the most complete line of Door Hangers produced under the name or brand of any one manufacturer.

There's "A Hanger For Any Door That Slides." Hangers for Barn Doors, House Doors, Folding Doors, Elevator Doors, Garage Doors and Warehouse Doors. Each perfectly adapted to the use for which it is designed and constructed. All built from high grade materials, by mechanics who have acquired a high degree of skill through years devoted to the art of Hanger making.

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No. 122 R W Royal Ball-Bearing Trolley House Door Hanger.



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I WANTED a handy little sharpening stone to touch up my gouges, bits, chisels, and to do other little sharpening jobs. I found just what I wanted in

THE CARBORUNDUM SLIP STONE

There ought to be one on every carpenter's bench—it cuts so quickly—so easily that it takes the burr off the edge in a jiffy—leaves it keen and smooth. The little stone holds its shape—doesn't fill,—and it's mighty handy in a dozen-and-one ways.—Pete also uses a Carborundum Round Combination Bench Stone.—Do You?

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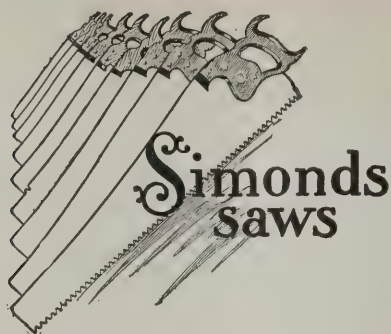
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All Kinds All Styles All Sizes

All prices. And they're all easy cutting.

This quality in a saw depends on the steel that's in it and the way it's ground. Simonds steel is not equalled for toughness and temper holding.

You can make the teeth sharp as a needle and they will stay that way for a long time. Blades ground thinner on the back than at the tooth edge. You saw faster and easier.

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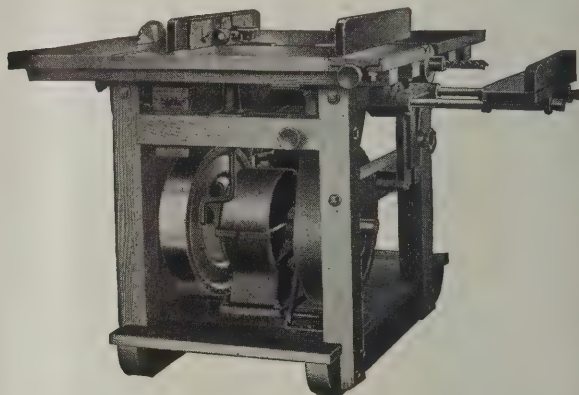
Owned and Operated by Nicholson File Company.

the mantel shelf, however, a fine French beveled plate mirror can be used with excellent effect.

The collection of designs from which the one here shown is a fair sample embraces an almost endless variety calculated to meet every reasonable requirement of the architect or houseowner. The printing is upon a surfaced paper, permitting the details to be brought out sharp and clear and affording an excellent idea of the appearance of the finished goods so far as such a thing is possible in a trade catalogue.

The New "Eveready" Saw Rig

The newer model of the Eveready Saw Rig, which is being made by the Oshkosh Mfg. Company, 541 South Main Street, Oshkosh, Wis., and with Chicago office at



The New Eveready Saw Rig. Fig. 8—General View of Machine with Boring Attachment

1452 Monadnock Block, is meeting with a very gratifying reception by carpenter-contractors, builders and others, because of its many features of merit and the reliable power plant incorporated in its make-up. The new gasoline engine is proving a marvel of efficiency under ordinary requirements and is claimed to possess abundant reserve power for emergencies. The trouble with many saw rigs appears to be a lack of reserve power, but this is said to have been completely overcome in the newer model of the Eveready, a general view of which, with boring attachment, is shown in Fig. 8 of the engravings. The new gasoline engine is of the company's special design. It is of the four-cycle type with $4\frac{1}{2}$ -in. bore and 6-in. stroke and is guaranteed to develop 4 h.p. A view of the gasoline engine which drives the new saw rig is shown in Fig. 9 of the engravings. Aside from its unusual reserve power the engine is said to start easily and its operations are steady and uninterrupted. It is of simple construction and all important parts are covered with a dust-proof housing. This, it is said, keeps them in smooth, harmonious running order and prevents all chance of a "hitch" from the time the engine starts in the morning until the power is cut off at night.

The bearings are constructed extra large and the engine itself is cast from tough semi-steel, is well balanced and equipped with approved "splash" oiling system, water cooled.

The frame of the Eveready Saw Rig is constructed of rock maple and the parts are firmly secured together with

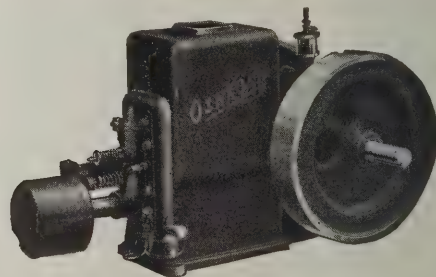


Fig. 9—General View of the Gasoline Engine Used with New Eveready Saw Rig

steel bolts in such a way as to allow for temperature changes. The result is a frame that is always rigid. With this rig the point is made that the enterprising carpenter and builder can do almost anything that he is likely to require from a planing mill, as the price of the rig includes cross-cut and rip saws, jointer head, sander, dado head, emery wheel, jig saw and boring bits, not omitting ripping guide and cross-cut gauge and miter device. The manufacturers point out that there is hardly a day during the winter season that the saw rig cannot be used as there are always a large number of standard pieces to be gotten out for use when the building season opens. An interesting circular describing the Eveready and all its

(Continued on page 48)

"NORMAN" STOVES AND RANGES

NONE BETTER MADE

Norman Equator Furnaces are built as well as it is possible to build furnaces. We know that by installing a Norman Equator you will be getting the best possible furnace value for your money.

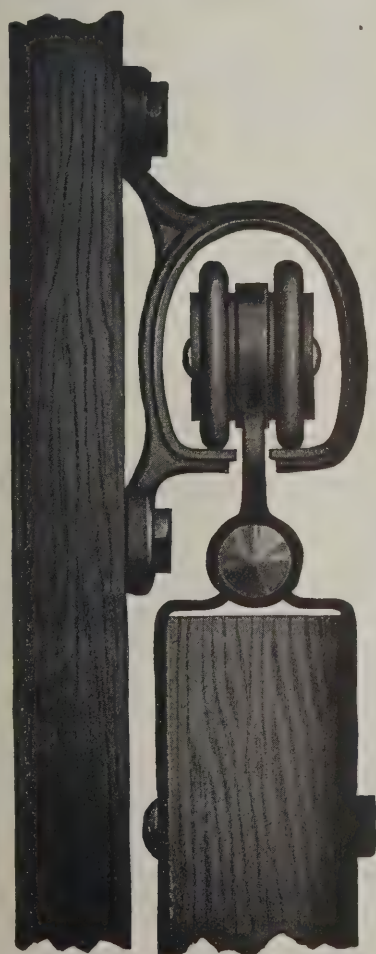


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Write today giving specifications as to size of house, exposure, etc. Our experts will send free estimates.

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A New Sensation TORNADO "STORM PROOF"

The Barn Door Track with the
DOUBLE SUPPORT

Track bracket attaches to building **BELOW** as well as above, which is a great advantage, as it adds materially to the carrying strength of the track.

A tubular track made with a perfectly level surface for the steel wheels of the hangers to roll on.

The Tornado is also furnished with an adjustable strap so that door can be raised or lowered and set in or out from the building.

Send for catalogue showing complete line of Door Hangers and Barn Equipment.

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We have a special 200-page
Catalog of Tools, No. 3097,
which we will send to Tool Users.

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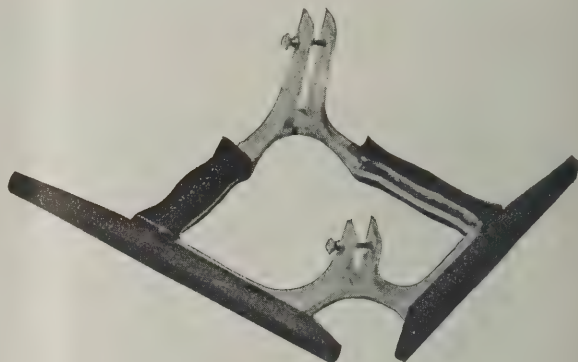
4th Ave. & 13th St.

NEW YORK, SINCE 1848.

attachments together with prices and terms can be obtained by any reader of *The Building Age* upon application to either of the addresses above given.

The "Monarch" Plaster Cornice Mold

One of the very latest candidates for popular favor in the way of a plaster cornice mold is the "Monarch" illustrated herewith and just placed upon the market by Timothy F. Horan, 10 Maple Street, Cooperstown, N. Y. This



The "Monarch" Plaster Cornice Mold. Fig. 10—View of the Mold

cornice mold is made in the best possible manner, the metal portion of the frame being of cast aluminum which will not rust and which at the same time renders the tool very light. The wood portion is of red birch and black cherry treated to make it waterproof. With the "Monarch" mold any size or style of plaster cornice for a room may be made complete—corners as well as straight work—without involving extra time or tools. Fig. 10 of the illustrations shows what may be designated as a plan view of the tool, clearly indicating the construction and the handles or "grips" by which the mechanic holds it, while Fig. 11 is a perspective view showing the tool with one of the blades in place ready for operation. A separate blade is used for each style of cornice, and a set consists of the mold proper and 10 blades. The mold is referred to as a great improvement over the old tools commonly used and which necessitated a carpenter spending two or three hours in making the mold and then a great deal of additional labor was required with small tools to complete the corners. The manufacturer states that the mold here illustrated and described represents the results of several years of careful study and experimentation and he now offers a mold that will make straight cornice and perfect corners every time without the necessity of using any other tools. The manufacturer has a large list of blades from which the mechanic may choose or the latter may submit an outline of the

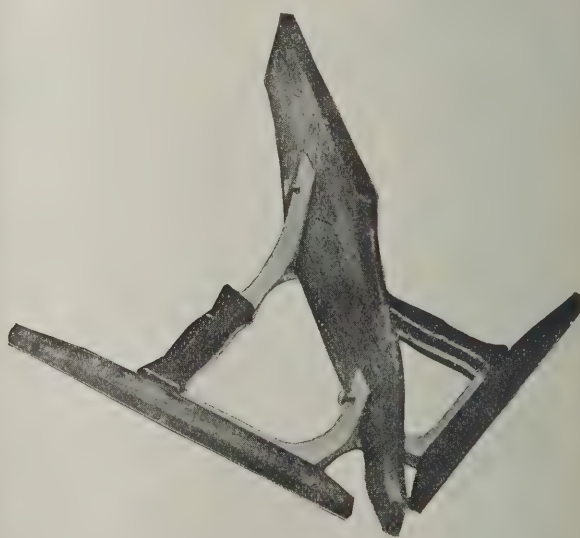


Fig. 11—Perspective of the Cornice Mold with Blade in Position

cornice he desires to make and the manufacturer will send him the blade or blades just the same as if chosen from the regular list with no extra charge. Both the blades and mold will be sent by parcel post for inspection and the carpenter, builder or contractor can purchase it on easy terms. The claim is made that this cornice mold will save its cost on nearly every job. Those of our readers who are interested can secure one of these molds for a five

(Continued on page 50)

Stanley Tools



Spoke Shaves

Every Carpenter has occasional use for a Spoke Shave, and at such time wants the best.

"Bailey" Iron Spoke Shaves have a reputation for quality, extending over a good many years.

The cutters are made from a high grade of steel, well tempered and sharpened, ready for use. The Handles are japanned, and through each a hole is made to enable the owner to hang the tool up out of the way.

Some recent improvements as to design add very materially to their value.

A dozen styles to choose from.

If your Hardware Dealer doesn't carry what you want, let us know.

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.



Builders and Carpenters

who realize that absolute customer-satisfaction is not only necessary for success but also the most profitable to them, are fast coming to appreciate

UTILITY Wall Board

For UTILITY WALL BOARD is a wonderfully tough and durable fibre board impervious to moisture. It is airtight and non-porous, and keeps the house dry, sanitary and healthful. Then, too, it makes a smoother wall than lath and plaster.

UTILITY WALL BOARD is nailed directly to the studding. It comes in sheets of convenient lengths and widths. It is easy to handle and apply. And you can put on UTILITY WALL BOARD at any time without regard to the weather.

You should write TODAY for the SAMPLE we will gladly send you. And for the Book of Interiors.

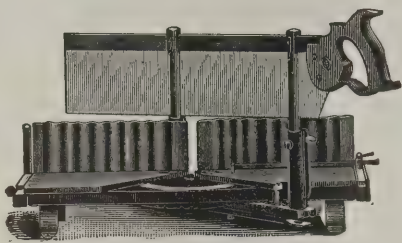
THE HEPPESS CO.

Also Manufacturers of Flex-a-Tile Asphalt Shingles.
Asphalt Paint and Asphalt Roofing in Any Finish
4501 FILLMORE ST. CHICAGO, ILL.



Goodell Mitre Box

Made of STEEL—Cannot Break
First in Quality and Improvements



Automatic Stops for holding up saw.

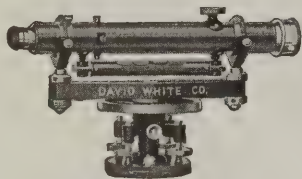
Corrugated Backs Graduated.

Gauge for Duplicate cuts and many other features.

If you want the best you will take no other.

Send for Circular K.

GOODELL MFG. Co., Greenfield, Mass.



Over 3000 in Use
THERE'S A REASON
White's
Improved Level

is especially designed for work where a general purpose level is required. Telescope is 12 inches long, with magnifying power 25 diameters and will detect an error of 1-16 inch in 300 feet.

Written guarantee with each instrument.

For further particulars and price ask for circular X.

David White Company

419 East Water St., Dept. B

Milwaukee, Wis.

SEND \$1.00

for this



remarkably handy tool

"The New Complete Saw Set"

embodying every practical, common-sense feature of all others, and these 2 features that no other saw set has: 1, adjustable side gauge to bring the point of each tooth under the anvil; 2, top clamp screw to regulate amount of set. Wearing surfaces made of hardened tool steel. Take advantage of the Parcel Post by sending \$1.00 for this attractive offer. We prepay postage.

Otis A. Smith

Rockfall, Conn.

Pearson's Automatic Shingle Nailer

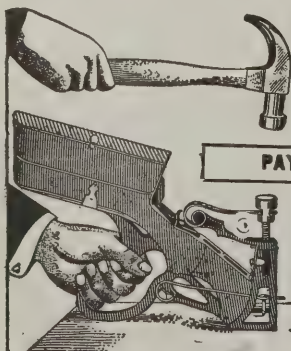
Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. Throw nails in by the handful—holds about 600 nails—start nailing. Nails can be driven through tin or quite heavy sheet iron.

Made in two sizes:
The BLUE Nailer for 3d common No. 14 gauge wire nails.

PAYS ITS COST ON ONE JOB

The RED Nailer for 3d galvanized No. 13 gauge 1 1/4-inch wire nails. Order through your dealer or sent prepaid for \$5.00.

Money refunded if not as represented
PEARSON MFG. CO.
Robbinsdale, Minn.



days' free trial by simply filling out the coupon presented in another part of this issue.

Selling Hot Air Furnaces Direct to Builders

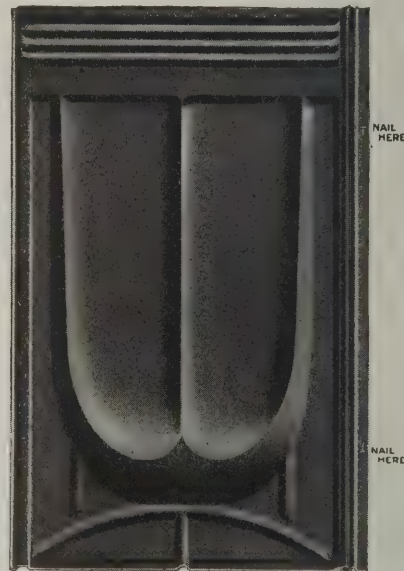
For many years past the Hess Warming & Ventilating Company, Tacoma Building, Chicago, Ill., has made a specialty of selling its hot air furnaces and equipment, all made to measure and ready to install, direct to builders, contractors and consumers. The purpose of such direct selling is to guard against errors in sizes and arrangement of parts which are apt to occur when the arrangement for heating is not planned by experts. The company undertakes in its own drafting rooms to prepare complete plans showing the size and position of every pipe and register required in a heating equipment and these plans with estimates are sent out to all inquirers without any charge or obligation assumed by the inquirer.

This method of selling has been very successful not only in securing efficient heating service, but in reducing the cost of the equipment to the consumer, for the factory profit only is added to the cost of labor and material—the usual middleman's profit being omitted.

The company guarantees the efficiency of its outfits and sells on trial, permitting the customer's local banker to hold the purchase price until his equipment is installed and tested during two months of winter weather. The company supplies complete plans and instructions for installing its equipment and loans all tools necessary so that any handy man can install the equipment. In view of the great care which the company exercises in preparing its work and the unusual terms on which it sells—insuring absolute safety to the buyer—it is not surprising that there has resulted a rapidly increased distribution of Hess furnaces. The company issues a handbook on furnace heating which will be found useful to any contractor or intending builder, and a copy of it can be had free on application to the address given above.

Edwards "Ohio" Metal Shingles

The latest addition to the already extensive line of sheet metal building material turned out by the Edwards Mfg. Company, 423-443 Eggleston Avenue, Cincinnati, Ohio, is the "Ohio" Metal Shingle illustrated herewith. The pattern shown in Fig. 12 is made in one size only, measuring 14 x 20 in. It is produced from the best quality Worcester grade terne plate painted or "Tightcote" galvanized. The shingle has been named after the great state in which the company's extensive plant is located



The Edwards "Ohio" Metal Shingles. Fig. 12—View of One of the Shingles

and special emphasis is laid upon the novel design and clean-cut embossing. Fig. 13 of the illustrations shows the appearance of the shingle when applied. The "Ohio" has the Edwards patent interlocking device, which furnishes a tight and thoroughly waterproof joint, while at the same time it absolutely protects every nail head from the weather. Another feature of this device is that it scientifically provides for the expansion and contraction of heat and cold. We understand that any architect, builder or contractor who may be interested in these goods can secure a sample on application to the company.

(Continued on page 52)



The Hand Axe that is Different

As different from the ordinary hand axe as daylight from darkness. Our axe has the quality. Made by experts from the best steel we can buy—and we know which is the best—we will guarantee it to outwear any two other axes on the market.

Drop us a card and let us tell you where you can see one of these—tell us the size you use and we will tell you the price.

THE L. & I. J. WHITE CO.

100 PERRY STREET

BUFFALO, N. Y.



Reg. U. S. Pat. Off.

The Guiding Sign to Quality and Efficiency in Tools

For nearly three-quarters of a century this trade-mark has protected the tool buyer.

It began by guaranteeing the genuineness of the finest saws ever made. Then, as the years passed, and new tools were added, one or two at a time, it gave the same great prestige to each until today it protects the buyer of a widely varied line of

DISSTON SAWS TOOLS FILES Quality Guaranteed

from the possible substituter.

There are few hardware stores that do not sell Disston products. If you find one that does not, send us his name. But whenever, or wherever you buy—

Look for this Trade Mark

HENRY DISSTON & SONS
INCORPORATED

Keystone Saw, Tool, Steel & File Works
Philadelphia, Pa.



Saved \$360 On Our Material Bill of \$969 Complete

I furnished all the material, complete, for this 8 room house for A. L. Clark, at Rochelle, Ill. Lumber, Lath, Shingles, Doors, Windows, Trim, Millwork, Guttering, Sash Weights, all Hardware, Nails, Paint and Varnish, (two coats inside and outside), everything complete, except masonry, for \$969. Dealers price was \$1,329, an exact saving of \$360.

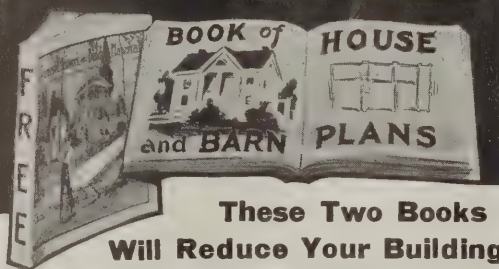
My two books, plan book (of 50 house plans) and building material catalog (of 8,000 illustrated bargains) mailed absolutely free and without obligation.

The books cost you nothing and show the way to big savings. In building and repair work they are a most valuable price guide.



H. B. Munger, Pres.
30 years experience

GOING TO BUILD?



These Two Books
Will Reduce Your Building
Expense. NOW—Mail Coupon

Doors of All Kinds



At Wholesale
Prices
**Glass
Doors
\$1.77
Up**
**Lock
Sets
21c
Up**

Wearwell Paint

Perfect guaranteed house
Paint, only
\$1.20
per gal. in
5 gal. kits.
We have
all kinds of
good paint
at
wholesale
prices.

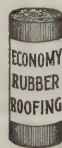


Economy Rubber Roofing

Clear Lattice
30c
Per 100 Feet



2-Ply 45 pounds
guaranteed 7 yrs.
\$1.35
3-ply 55 pounds
guaranteed 10 yrs.
\$1.60



Chicago Millwork Supply Co., 1424 W. 37th Street, Chicago

Chicago Millwork Supply Company,
1424 West 37th Street, Chicago, Ill.
Gentlemen: Please send your FREE Books, listed below, to
Name.....
Address..... State.....
Catalog No. 45, Building Materials.
Book No. 55, House and Barn Plans

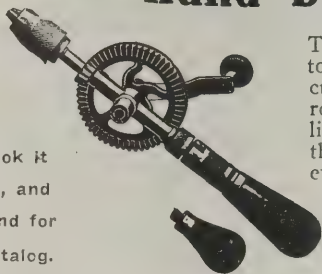


To Meet Your Need

for a really first class dependable drill, at a moderate price, we offer our

Hand Drill No. 3

Look it
up, and
send for
catalog.



This is a rarely good tool for the money; has cut gears and chuck for round shanks 0 to 3/16"; light, yet strong and thoroughly well made in every detail.

Millers Falls Company

28 Warren St., New York

A very neat four-page folder which is being sent out for the purpose of calling special attention to this shingle



Fig. 13—Appearance of the "Ohio" Metal Shingles on a Roof

also carries some interesting comments bearing upon the relative merits of wood shingles versus metal shingles.

ROOF FRAMING MADE EASY

By the Use of Our Little Book

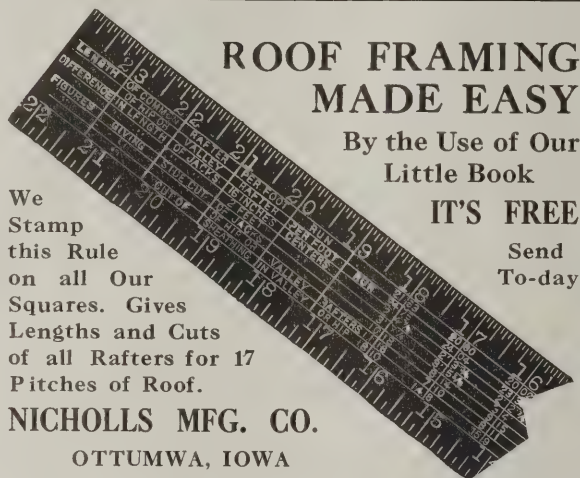
IT'S FREE

Send
To-day

We
Stamp
this Rule
on all Our
Squares. Gives
Lengths and Cuts
of all Rafter for 17
Pitches of Roof.

NICHOLLS MFG. CO.

OTTUMWA, IOWA



INTRODUCTORY TRIAL OFFER

If the **SELF-SETTING PLANES** are not sold in your town and you write us saying "I saw your trial offer in Building Age," we will send you particulars, a carpenter's pencil and our \$1.00

THE BEST IS THE CHEAPEST

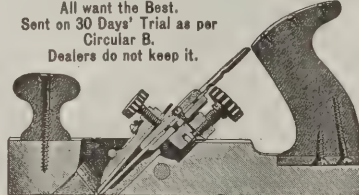
None Cheap but the Best.

All want the Best.

Sent on 30 Days' Trial as per

Circular B.

Dealers do not keep it.



Certificate, which we will receive as \$1.00 in payment for a **SELF-SETTING PLANE** as stated in our \$1.00 Certificate, and if this S. S. Plane is unsatisfactory and returned to us at our expense, we will send you \$1.00 more than you sent us, as the \$1.00 Certificate says.

As this paper guarantees we will do as our advertisement says, you know the plane must be

TRY THE SELF-SET-

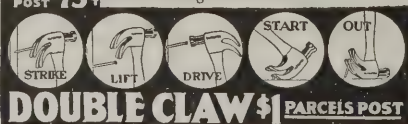
O. K. ALL WE ASK is to have you TRY THE SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained, catty, knurley, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT. If it is not worth to YOU, OR YOUR MEN, TWICE ITS COST, return it at our expense as above stated.

If you send us the addresses of ten carpenters, no matter where they live, we will send you another hard, tough carpenter's pencil. Give the **SELF-SETTING PLANE** a chance to **PROVE ITS WORTH**. If it **FAILS**, return it and we will return your money. **GAGE TOOL CO., Vineland, N. J.**



ORDER THE "HYNAILER" 75c

Best single claw hammer ever made. Holds the nail for high, low or far across driving. Grips plain part of nail so strongly as to pull the head of nail clear through the wood.



ORDER THE "DOUBLE CLAW" \$1

Best Hammer ever made. Holds the nail for starting to drive where you can not reach with two hands. Pulls the nail out straight without a block.

DOUBLE CLAW HAMMER CO.

453 BROADWAY,

BROOKLYN, N. Y.

Color Combinations in Cabot's Shingle Stains

We have just received from Samuel Cabot, Inc., Boston, Mass., a copy of the color-chart which has been issued, reproducing as nearly as possible by the most careful lithographic process on paper, the beauty of the coloring effects of Cabot's creosote shingle stains. The object is to show the artistic qualities of the stains and how the various colors harmonize when used together. The several pages of which the chart is made up are each divided into three sections, representing the roof, the second story and the main story. By manipulating these divided pages or leaves 64 different combinations of color can be obtained of such variety as to prove helpful in selecting a pleasing color scheme for a house of any style or shape. For example, the first page or leaf shows a Colonial house with first and second stories of Bungalow brown and the roof of medium moss green; changing the roof section and permitting the upper section of the second page to show, gives with the Bungalow brown for the body of the house a roof of silver gray. Another change of the roof section gives a light moss green, and still another change a roof of medium tile red. Although originally made for shingles, the stains are now used for all other kinds of exterior woodwork, this being especially true of the rough and dressed siding of Bungalows and country camps and cottages where the several transparent coloring effects are much more appropriate and harmonious than the opaque heavy coating produced by the use of paint. The claim is made that a gallon of stain will cover 100 sq. ft. of rough shingles or other lumber two coats and about twice as much dressed lumber. It is also stated that 2 3/4 gallons will dip 1000 shingles. No special skill is required to apply the stains and while it is always best to employ a painter where one can readily be obtained the work can be done by any intelligent boy or laborer if the work is back in the country where painters are not available. We understand that samples of shingle cedar actually stained with Cabot's stains will be sent to any reader on request together with catalogue and full information.

TRADE NOTES

The Indiana Mosaic Flooring Company, Indianapolis, Ind., has been incorporated with a capital stock of \$150,000 for the purpose of manufacturing tile flooring. We understand that a plant will be established under the supervision of Spanish experts. Lee R. Finehout of Indianapolis is president; George D. Lessene of Mobile, Ala., vice-president, and William F. Tebbets, also of Mobile, will serve as secretary-treasurer.

The Columbus Varnish Company, Columbus, Ohio, has commissioned Architects Howard & Merriam to draw plans for a two-story addition to its present plant.

At the recent convention of the National Association of Sheet Metal Contractors in Washington, Keasbey & Mattison Company, Ambler, Pa., demonstrated the application of its octagon and diamond shaped asbestos "Century" shingles by means of a well constructed model house.

The Joseph Dixon Crucible Company, Jersey City, N. J., is distributing an attractive booklet relating to "Dixon

(Continued on page 54)

You Can Get This "YANKEE" DRILL

with or without the Ratchet

Take it either way, this is the nicest little tool for most any kind of small drilling in wood or metal. It takes round shank drill points up to 3/16 inch diameter. The double ratchet tool No. 1530 is a great advantage in working at close quarters, but for ordinary all round work a No. 1430 will answer just as well. It is built on the same lines, as well made in every particular, but without the ratchet; hence the lower price. The gears are cut out of the solid metal of wide face, giving them extra strength and long wear. The magazine in the handle is quite ample for a good assortment of drill points.

Send for the "YANKEE" BOOK—a postal brings it.

NORTH BROS. MFG. CO., Lehigh Ave., Philadelphia, Pa.

No. 1530

\$2.80

with
Double
Ratchet

No. 1430

\$1.75

without
Ratchet

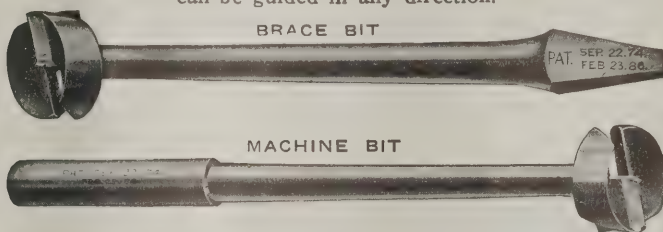


THE "FORSTNER" AUGER BIT

LABOR
SAVING

BORES ANY ARC OF A CIRCLE

As it is guided by its circular rim instead of its center, and can be guided in any direction.



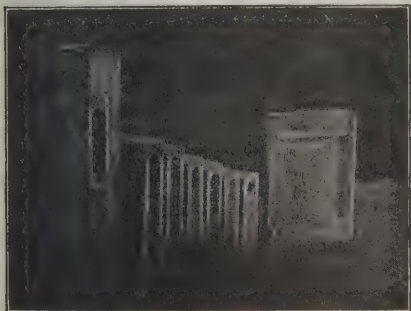
Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wood working and against difficult grain and knots. Special prices in full sets.

THE PROGRESSIVE MFG. CO., Torrington, Conn.

The Improved Perfection Mortiser

Any size, 6 1/4 inches to a round hole

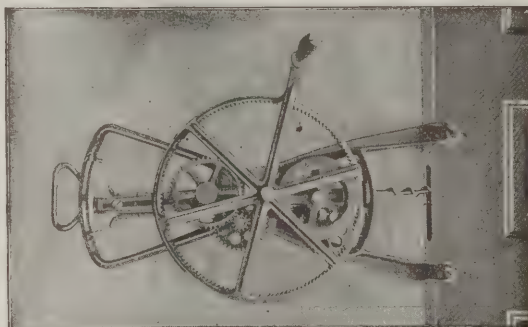
Bit moves up and down while boring



Cuts mortise perfectly true and clean. Straight in at top and bottom, with straight back wall.

positively makes complete a mortise for locks, doing the work from start to finish. No other tools required.

The only tool of its kind.

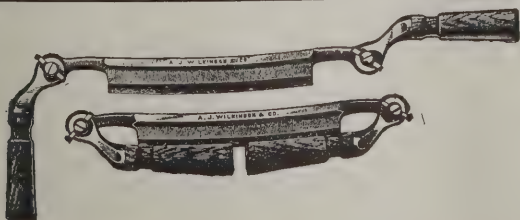


Perfection Mortise Machine Co., Columbus, Ohio



The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

Brown's Race
Rochester, N.Y.



Use Our

Folding and Adjustable Handle Draw Knife

It is adjustable to any position, adaptable to awkward places, absolutely rigid when set, handy and compact, a time-saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches. Write for prices and discounts.

A. J. Wilkinson & Co., 180-188 Washington St., Boston, Mass.

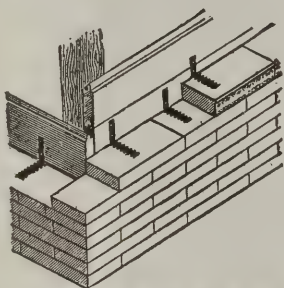
Please quote BUILDING AGE when writing to advertisers.

BUILDING, ROOFING and INSULATING PAPER WOOD-WORKING GLUES

SAMPLES AND PRICES SENT ON REQUEST

C. B. HEWITT & BROS.

48 Beekman St., New York City



The Most Substantial

Walls are those built in which our **WHALEBONE WALL TIE** is used. Better than others' best.

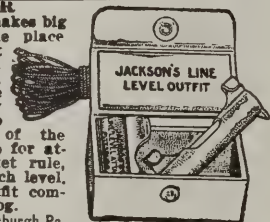


Samples on request

ALLEGHENY STEEL BAND COMPANY
BELL PHONE: 718 Cedar North Side, PITTSBURGH

A UNIQUE TIME SAVER

The Jackson Aluminum Line Level makes big saving of time and labor. Takes the place of the old-fashioned sixteen foot straight edge. May be carried in vest pocket. No contractor, builder, carpenter, etc., can afford to be without. Stretch line and hang the level on it—It's positively accurate. Complete outfit goes into neat leatherette case and consists of the level with 40-ft. line also spring clamp for attaching level to steel square or pocket rule, thereby serving as a plumb rule or bench level. Ask your dealer or send \$1.00 for outfit complete post paid. Send for Tool Catalog. J. Woodwell Co., Sole Agts., 201-203 Wood St., Pittsburgh, Pa.

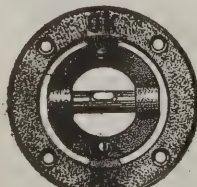


BUCK BROS.

Buck Brothers' Tools are **LASTING** tools—they keep their edge.

We make a full line which includes bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.

BUCK BROS., Millbury, Mass.



ACTUAL SIZE 3 1/4".

CLIMAX OF SIMPLICITY

The O.K. Adjustable Plumb or Level Fixture to be attached to 6 or 8 ft. plumb staff or straight-edge for plumbing door jambs, studing; leveling joist, foundations, etc. Made of high grade aluminum. Don't waste your time and patience with the cumbersome plumb-bob. Send today for the O.K. Fixture—50c each or \$5 per doz. post-paid, P.O. or express money order.

S. L. Stratton & Co.,

Box 776 - Columbus, Ohio.



THE YANKEE Compound Level

Just the thing for a Builder.
Accurate—Low Priced.

FROST-ADAMS CO.
Cornhill, Boston
Send for our catalogue

Graphite Brushes. These brushes are for dynamos and motors, being composed almost entirely of high-grade graphite, preventing sparking and wear of the commutator. The claim is made that they do not gum the commutator, are tough and strong, and have very long life if properly adjusted. A copy of the booklet can be secured by any interested reader by application to the address above given.

Miller & Doing, 83-87 Washington street, Brooklyn, N. Y., had a very attractive booth at the Washington meeting of the National Association of Sheet Metal Contractors. The frame timbers of the booth were covered with stamped ornamental moldings, while the panels carried sheet metal ornaments representing the latest effects in stamped art work. In addition there were spun metal balustrades, a 22-in. ball spun from No. 18 gauge galvanized material and ornamental and circular moldings. The exhibit was in charge of Robert Miller and Parker Doing.

Smith & Hemenway Company, 150 Chambers street, New York City, makes the announcement that instead of carrying stock in two places it has arranged to carry a complete stock after July 10 at the factory of the Irvington Mfg. Company, 130 Coit street, Irvington, N. J., and after the date named all shipments will be made from that place. This arrangement will tend to greatly facilitate shipments of goods to customers and at the same time make more prompt deliveries. The company has largely increased the facilities of the factory and stockroom to take care of additional stock and the increased business.

The last issue of the "Universal Bulletin" which is issued each month by the Universal Portland Cement Company, 72 West Adams street, Chicago, Ill., contains the usual amount of interesting matter relative to the various uses of concrete. The illustrations, which cover a wide range of subjects, consist of well executed half-tone engravings and the entire make-up of the matter is such as to at once appeal to the artistic as well as to the practical eye.

The Tubular Heating & Ventilating Company, Philadelphia, Pa., made an exhibit of its Forbes low down furnace at the Washington meeting of the National Association of Sheet Metal Contractors, the merits of this well-known heater being carefully described by those in charge of the exhibit.

The Detroit Steel Products Company, Detroit, Mich., is distributing its new catalog of Fenestra for 1913. The publication is of special interest to architects and builders showing as it does the construction of the company's improved sash, while giving tables that the architects will find convenient for reference. A feature of the catalog is found in the numerous photographs of buildings in connection with which Fenestra sash have been used.

Some very interesting information concerning the manufacture of natural cement is contained in a booklet recently issued from the press by the Rosendale Natural Cement Company, 50 Church street, New York City. The main object of the little work is to give architects and builders some definite information regarding this building commodity and particularly the merits of the brands of the company and their analysis.

A feature of the Washington convention of the National Association of Sheet Metal Contractors was the hall where attractive displays of manufactured goods of interest to the delegates were to be found. One of the most attractive exhibits was that of the Wheeling Corrugating Company, Wheeling, W. Va. By the exercise of ingenuity the company's well-known Crescent open-hearth galvanized sheets were made to lend themselves to a decorative scheme in connection with metal shingles. A catalogue of the company's metal ceilings was presented to each visitor and fresh cut flowers were distributed to the ladies.

"Batter Up" is the suggestive title of the picture card constituting the calendar for June sent out by the Richards-Wilcox Mfg. Company, Aurora, Ill. The picture represents the very attractive young lady who has posed for a long series of interesting cards sent out by this company and in this instance she is shown in baseball uniform with bat poised in position to "tear the cover off the ball" in a home run hit. On the back of the card appears the statement that "when a request for a door hanger is 'pitched' across the counter, the R-W dealer invariably 'lands' on it for the order. There is no 'fanning the air'—there are no 'holes in the bat,' no 'strikeouts'—he's able to meet the demands of his trade because he can supply a hanger for any door that slides."

The Pullman A. V. M. Company, York, Pa., has recently filled a very important Canadian order for its

(Continued on page 56)

\$739 **BUYS THE MATERIAL NEEDED
TO BUILD THIS HOUSE!**

HOUSE DESIGN No. 6-A

Here is a house that has been built about 400 times. It is our
Leader. Size 28 ft. x 33 ft. 6 in., contains 7 rooms, bath and



spacious front porch. Designed with great-
est care, using mat-
erial without waste;
therefore can be built
so economically it
will surprise you. A
home of elegant ap-
pearance and splen-
did material. Stand-
ard solid construc-
tion; no make-shifts
of any kind. A beau-
tiful home at a
splendid money sav-
ing price.

**Ask for Free
Book of Plans
No. S. B. 154**

It explains our
Great Building Offer.
Tells all about the
material, a style of
solid construction

our houses. Our prices are lower than you can possibly obtain
anywhere else.

Our prices include all BRAND NEW material needed to build
this house, every bit of it, except Masonry, Plumbing, Heating
and Paint.

We Make Plans To Order

Plumbing and Heating Material at a 30 to 50 per cent saving.
Our stock is all brand new and first-class. Write for our low
prices.

Chicago House Wrecking Co., 35th and Iron Sts., Chicago

Thomas Morton

245 Centre Street
NEW YORK

Copper Cable
Steel Cable

Champion Metal
Steel Champion

SASH CHAINS
CHAINS

For Suspending Heavy Doors,
Gates, Etc.

All of SUPERIOR QUALITY

The Smith & Egge Mfg. Co.

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Sash Chains



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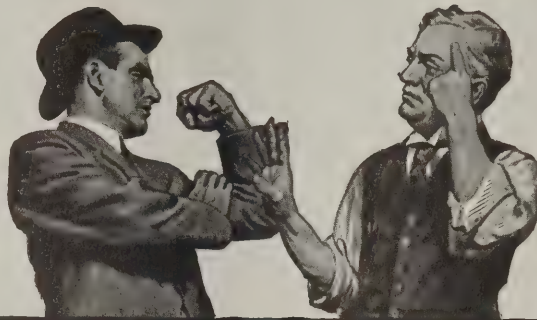
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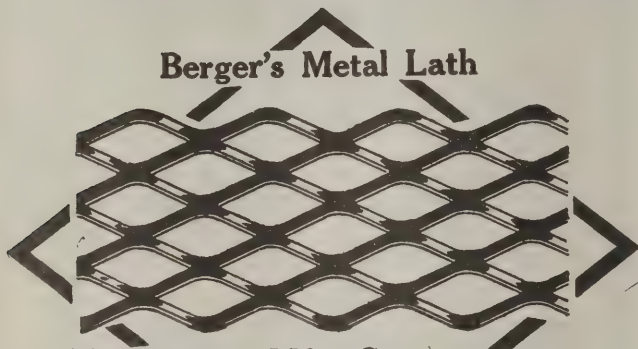
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product, the shipment consisting of a carload of roof ventilators which went to Toronto. The buyer is said to have paid a Canadian duty of 30 per cent in addition to the freight, representing probably that much more than the cost of ventilators manufactured in Toronto, which is taken as a high testimonial to the desirable features of the Pullman product.

The Metal Shingle & Siding Company, Saskatoon, Sask., is about erecting a plant for the manufacture of metal shingles, metal siding and roofing, cornices, etc.

Benjamin F. Affleck, general sales agent of the Universal Portland Cement Company, 72 West Adams street, Chicago, Ill., is the subject of flattering comment in a quarter-page article in the April 27 issue of the Chicago Sunday *Tribune*, in which Mr. Affleck's rise from machinist to sales manager is recorded and some account is given of the manner in which this rise was affected.

An interesting type of cistern is being built and marketed by the Patent Concrete Cistern Co., Grand Forks, N. D. The cisterns are built in the company's yard and subsequently placed in excavations made of the proper size. The construction is novel and seems destined to replace cisterns of other materials.

A. T. Enlow, manager of sales of the Stark Rolling Mill Company, Canton, Ohio, has resigned his position and has become associated as partner with the Pedlar People, Oshawa, Ontario, Canada, who are large sheet metal factors, having branches at all Canadian points as well as in many parts of Europe. While sales manager of the Stark Rolling Mill Company Mr. Enlow devoted considerable time to the exploitation in the Canadian field of Toncan metal, the well-known anti-corrosive, rust-resisting sheet metal product, and through the Pedlar People he made it almost as well known there as in the United States.

The establishment of a Chicago factory is the latest innovation of the Triple A Machine Company, Chicago, Ill. Factory and offices are located in the Canepa building, 300 W. Indiana street. With this recent addition, the company has now three factories in operation, the others being located at Manistee, Mich., and London, Ont. With these additional facilities, business in the Middle West is expected to increase materially. A full line of floor scrapers will be carried, catalogues of which may be had on application.



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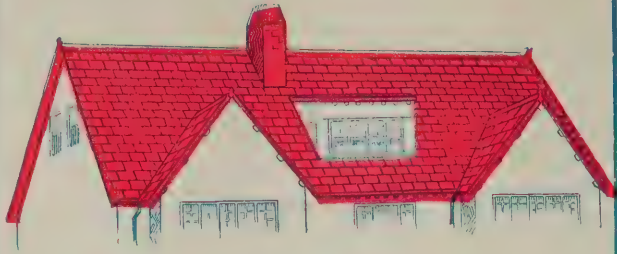
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BUILDING AGE



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THE BUILDING AGE

NEW YORK, AUGUST, 1913

THE ATTRACTIVE HOME OF A KANSAS ARCHITECT

What One Member of the Architectural Profession Has Planned for His Own Occupancy—Many Interesting Features Involved

NO doubt many of our readers often wonder what sort of a house an architect would plan for his own occupancy, some probably carrying the idea that it would differ very materially from the home planned for a layman and entirely overlooking the fact that every dwelling is supposed to be designed to meet

A feature of the living room is the brick fireplace with its seat at the left, the numerous windows which afford ample light and the combination stairs which rise against the outside wall to the left of the fireplace, the platform being lighted by an oriel window. Beyond the living room is the dining room and beyond



The Attractive Home of a Kansas Architect—Photographic View from the Street Front

the requirements of a specific case and conform to the needs of the family that is to occupy it. With a view, however, of showing our interested readers what one architect has planned for himself we present herewith pictures and drawings relating to the very attractive home of Henry S. Conrow, a registered architect at Wichita, Kansas. The photographic views show the exterior treatment of the building with its beautiful surroundings while the interior view affords an excellent idea of the comfort that is within.

An inspection of the plans shows that on the main floor are living room, dining room, den, kitchen, etc.

it in turn is the den which may be entered from the porch at the side. Communication between the dining room and kitchen is established through a commodious well-lighted pantry. The rear porch has a space for the refrigerator so that it is not necessary for the ice-man to enter the kitchen. The rear stairs rise directly from the kitchen to the platform of the main flight, a door being placed six steps up so as to cut off the odors of the kitchen from the front part of the house. The stairs to the cellar are directly under the main flight and lead down from the kitchen.

On the second floor are four sleeping rooms with am-

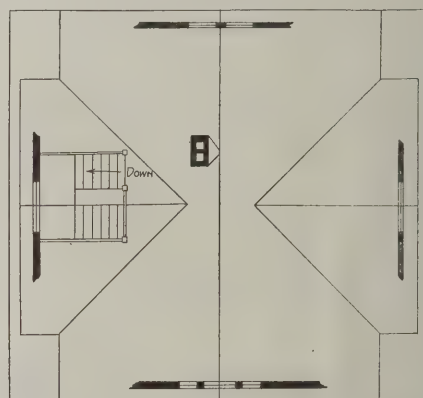
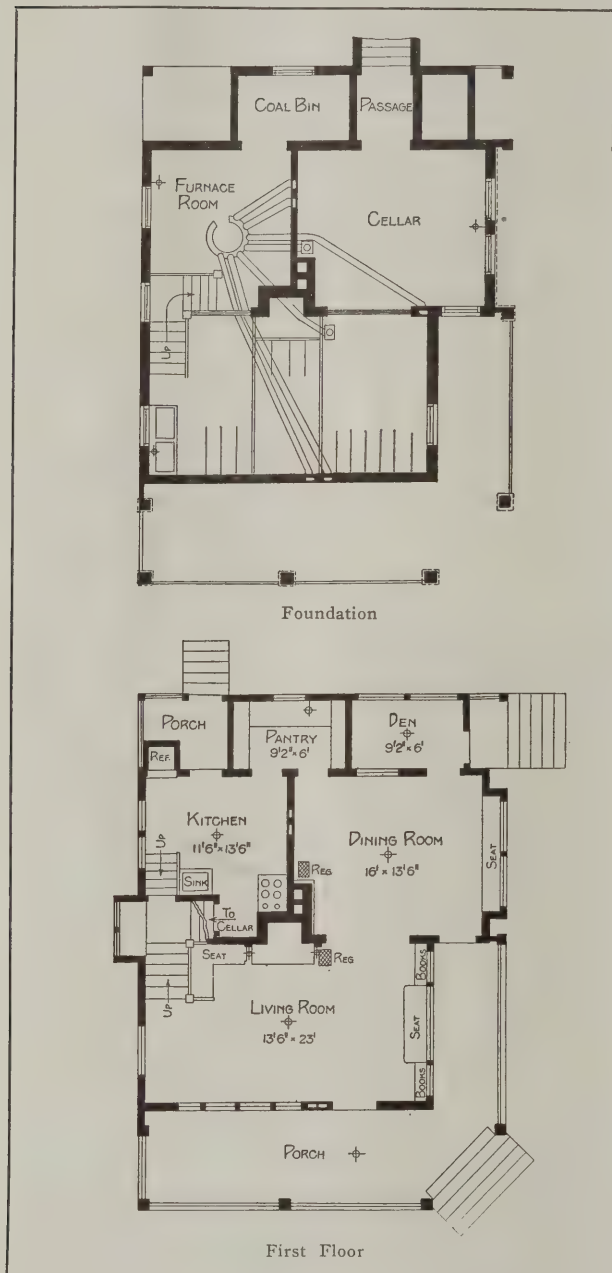
ple closet room and a bath room. The stairs to the attic constitute what may be termed a continuation of the main flight.

The foundation walls are of reinforced concrete up to the grade line, above which and extending to the sill are rock face cement blocks. The entire frame of the house is covered with a No. 1 yellow pine sheathing, over which is placed tarred felt. From the foundation to the belt course the exterior is of cement stucco dashed with crushed "Joplin flint" and applied to a lath

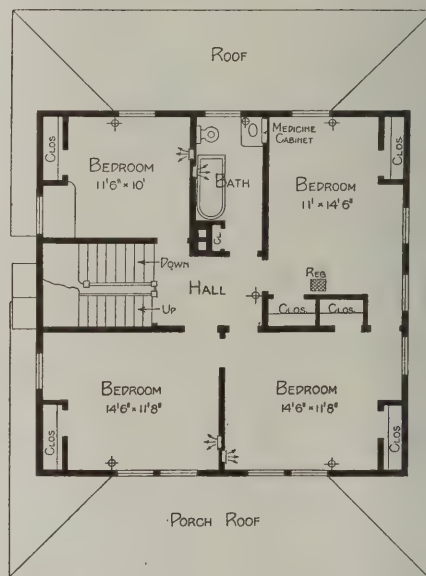
burlap with skeleton wainscot and cap while the side walls are covered with a light straw pulp paper. The ceiling is of light straw moire. The den has burlap dado with plate rail. The side walls and ceiling are covered with small figured light tan paper, the burlap being a darker shade of tan. The finish and floors of the kitchen are yellow pine treated with Berry Bros. liquid granite floor varnish. The pantry has natural yellow pine finish and floors, shelves, etc.

The second floor rooms as well as hall and closets have yellow pine floors and finish stained and waxed. The bath room has white enamel finish with a wainscot of Keene's cement. The attic is not finished.

All interior stains, varnishes, etc., are of Berry Bros. make and the hardware has sand blast antique



Roof Plan



Second Floor

The Attractive Home of a Kansas Architect—Floor Plans—Scale 1/16 in. to the Foot

of Clinton wire cloth. Above the belt course and also covering the roof are cedar shingles stained a moss green. The woodwork is trimmed a light straw color, while the lattice work is painted dark green. All exterior finish lumber is No. 1 cypress.

The basement is 7 ft. 6 in. in the clear and is divided into laundry, furnace room, storage, coal bin and workshop. The living room, dining room and den are finished in quartered oak with floors of the same material, stained and waxed. The living room is wainscoted about 4 ft. high and has ceiling beams with burlap panels, built-in bookcases and seats, a mantel of clinker brick and side walls covered with a dull blue figured tapestry paper. The dining room dado is of dull blue

copper finish made by P. & F. Corbin, New Britain, Conn.

The bath room hardware, however, is an exception, this being nickel plated. The bath room is fitted with a tub and lavatory, of enameled iron, and a "Superior Duroware" siphon jet closet with nickel plated fixtures.

In the laundry is a Pittsburgh hot water heater, stone laundry tubs made by Alberene Stone Company, 223 East 23rd Street, New York City, and a combination gas and coal furnace made by the International Heater Company, Utica, N. Y. Cement floors extend over the entire basement.

The entire house is wired for electric lights and

piped for gas. It has old brass combination lighting fixtures and hot and cold water to all fixtures except the toilet.

The contractors for the carpentry work were Ayres & Fredericks; for the plumbing work the R. R. Moore Heating & Plumbing Company, and for the painting and interior finish A. A. Buck, all of Wichita, Kansas.

The contract was not let for the complete job to a general contractor but the different classes of work were executed by different contractors. The mill work was furnished by the Western Planing Mill Company.

As intimated above, the house here shown is that of Henry S. Conrow, a registered architect of Wichita, Kansas, and the erection was carried out under his

Ventilation and Warming of Churches

The requirements necessary to make the interior of churches healthful for use and occupation are enumerated as follows in a paper by J. Osborne Smith, read before the recent congress of the Royal Sanitary Institute held at York, England:

1. Ample means of cross-ventilation from openings in opposite sides of the building below or near the breathing line, in order to get rid of foul air at the very spot where it is generated. Cross-ventilation is also desirable high up near the flat ceilings, or in the sloping roof spaces, the openings being arranged to check or divert downward currents.



The Attractive Home of a Kansas Architect—A Side View as Seen from the Street

personal supervision. The approximate cost of the house is \$5,000.

One of the features of the coming Panama-Pacific International Exposition to be held in San Francisco in 1915 will be exhibits of examples of modern architecture, including among others the splendid structures and landscaping of the exposition itself, together with a remarkable consideration of the city of San Francisco. The exhibits will comprise drawings, models and photographs of architecture, specimens of artificial stone and kindred building material, process used in testing structural materials and special contrivances for safety, comfort and convenience in buildings.

The present depression in the building trade in Liverpool, England, is stated to have been brought about, not by over-production, but by legislation.

2. The inlets for fresh air to be as short as possible, capable of being readily cleaned, well distributed, and allowing at least one foot super of clear opening to about ten people.

3. Adequate means for warming incoming air, so that it may be not only warm but also pure and fresh as possible at the breathing line during services. Warming and drying air is a source of comfort, especially in a damp climate, but the drying can be so easily overdone as to be inconvenient. High temperatures should be avoided, and provision should be made for supplying additional vapor to the internal air when required.

4. Warmth just below open roofs, clerestories and tall windows to prevent down-draughts.

5. Jointless solid floors, which can be readily kept clean.

6. Seats and fittings which do not obstruct the passage of light and air, or hinder the cleaning of floors.

7. Means for preventing the deposit and movement of dust.

In cold weather, warmth, genial, all-pervading warmth is desirable inside churches during occupation; the cold bracing, breezy air which is so enjoyable when one is moving about is not welcome inside where per-

outwards and closed by checksprings, and by placing radiators or stoves near the entrances.

3. Preventing down-draughts by fixing hot-water pipes in roof spaces and below clerestory and other windows.

4. Generous warming apparatus, well distributed, without excessive temperatures either in pipes or warm air flues.

As methods of warming we have:

1. Large close stoves near inlets for fresh air, which are very useful.

2. Underground stoves, the heat ascending through grating at floor level, are effective, but the air is often too dry and polluted by dust.

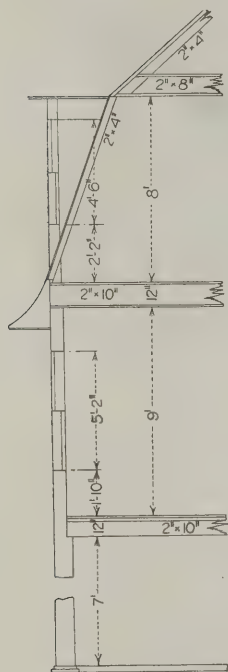
3. Warm air apparatus, by which cold air is admitted either from the church or from outside to a furnace room or battery of large pipes, and discharged into the church through vertical or horizontal gratings. This is usually an efficient arrangement, but the warmed air is liable to be contaminated by passing through flues and over pipes which are cleaned only at rare intervals.

4. Low-pressure hot-water apparatus with radiators having fresh air inlets. This is effective and generally satisfactory when inlets are accessible for cleaning, and radiators are in suitable positions.

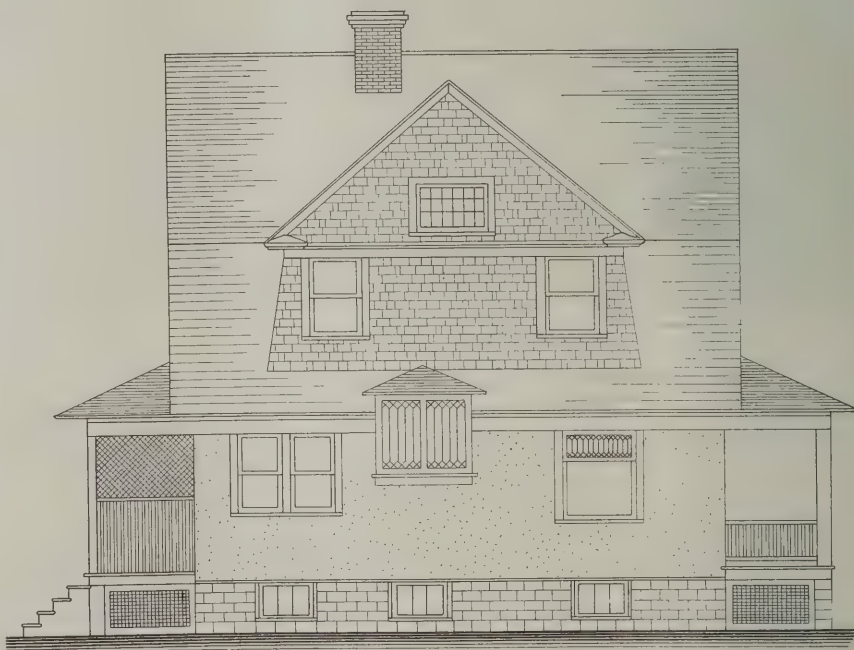
5. Low-pressure hot-water ap-



Front Elevation—Scale $\frac{1}{8}$ In. to the Foot



Section—Scale $\frac{1}{8}$ In. to the Foot



Left Side or West Elevation—Scale $\frac{3}{32}$ In. to the Foot

The Attractive Home of a Kansas Architect—Elevations and Section

sons are sitting. Provision, therefore, must be made for:

1. Warming incoming air during the services as well as the inside air before occupation.

2. Preventing the inrush of cold wind currents from windows by fixing hopper lights to direct currents upwards, and from entrances by double doors opening

paratus with pipes in channel. For reasons previously stated this is an insanitary method. It is also ineffective, as the heat given off is generally reduced by the non-conducting matter accumulating on the pipes.

6. Medium-pressure apparatus with small bore pipes, next outer walls or in channels, in coils, or round skirting of raised wood floor on which are the seats. A

useful and economical method for distributing warmth when pipes are kept above the floors.

Much may be done to make church interiors healthful by giving attention to a few negatives:

Don't have air brought in at floor level from beneath gratings.

Don't put hot-water pipes in channels under gratings in the floors.

Don't cover doorways with curtains.

Don't close all windows or ventilators at the same time; if a southwest gale prevails, those on the north side might be open without discomfort, and vice versa.

Don't try to save fuel by closing all the inlets and outlets for air when the church is occupied; it is false

Value of Detailed Drawings in Figuring Building Contracts

Examine two sets of plans turned out by any two architects and you will find great variation in the way details are drawn. In the office of a certain architect who does residence work exclusively, an interesting fact recently developed. About a year ago plans for a residence were made and bids taken. As frequently happens, the bids were so high that the owner decided to wait over a season, thinking he might get lower bids, says a writer in a recent issue of *Construction News*. When the next year came around orders were given to take new bids and the architect



The Attractive Home of a Kansas Architect—View in the Living Room Looking Toward the Dining Room, the Door to the "Den" Being Seen in the Extreme Background

economy. They may be closed when the building is empty.

Don't fail to warm sufficiently a large proportion of the incoming air in cold weather.

Don't suffer down-draughts to exist; they are most dangerous to health, and can be prevented by judicious warming.

Don't fail to warm the triangular spaces in roofs which are open up to the ridge.

Don't have many supports beneath the seats, so that floors can be kept readily clean.

Don't fail to concentrate warming near entrances.

Don't encourage the use of blinds, curtains, matting, wicker seats, or anything which harbors dust.

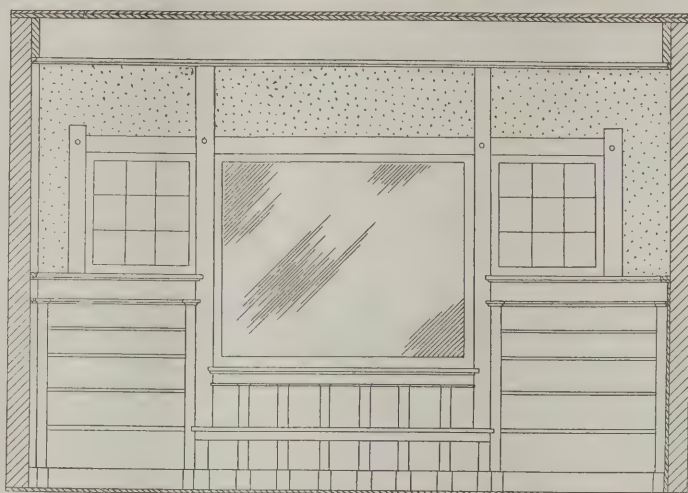
got out his drawings to look them over before having new blueprints made. He noticed that few details were included in the drawings—so few, in fact, that he wondered how such a set of plans ever got out of his office until he remembered how hurriedly they had been made. A set of inch-scale details was immediately drawn up and included in the plans—simple drawings showing designs of millwork and special features in the construction.

When bids came in once more the architect was astonished to find prices lower than they had been the first time, notwithstanding the brisk advance in cost of building materials. Upon investigation he found that the lower bids were the result of the new details. Contractors who figured the first time, not understanding just how the house was to be built (owing to incomplete drawings) had been afraid to figure close, but as soon as they saw the illuminating new details, they could figure more accurately. Details are important items in plans and architects who neglect to prepare

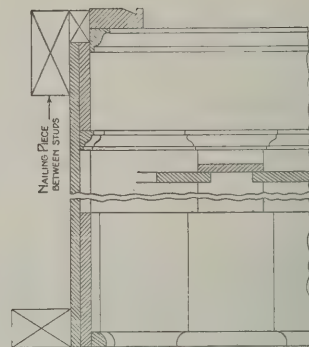
The leading forest schools of the country not only have their own forest tracts for continuous experiments, but give their students actual experience in the woods by having them take part in big lumbering operations.

details until contracts are let frequently unintentionally make work cost more than it should. Even a few quarter-inch scale details showing special features of

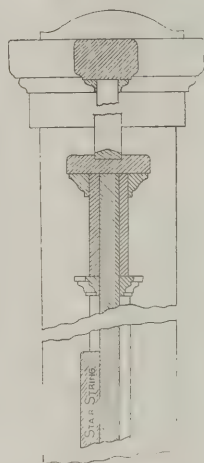
tended for the instruction of those who are interested in the application of the National eight-hour laws. The pamphlet gives the full text of the law approved



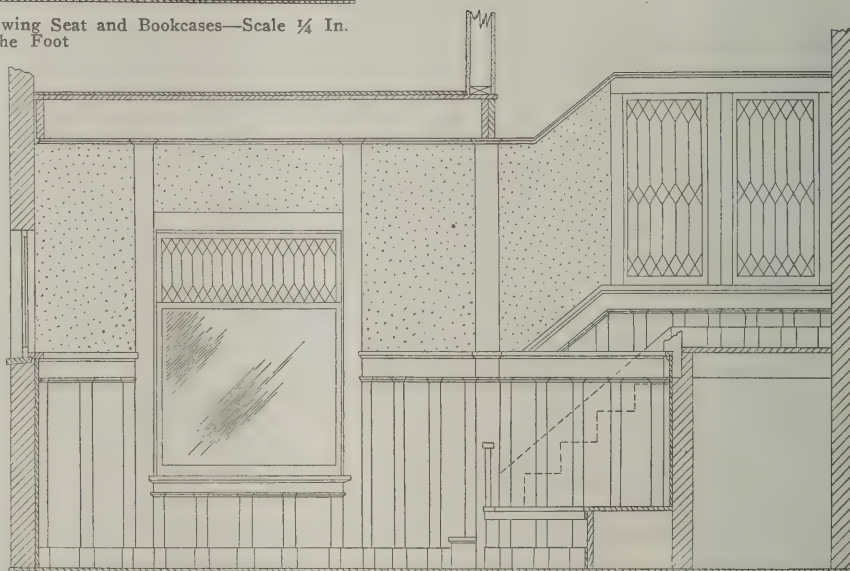
East Elevation in Living Room Showing Seat and Bookcases—Scale $\frac{1}{4}$ In. to the Foot



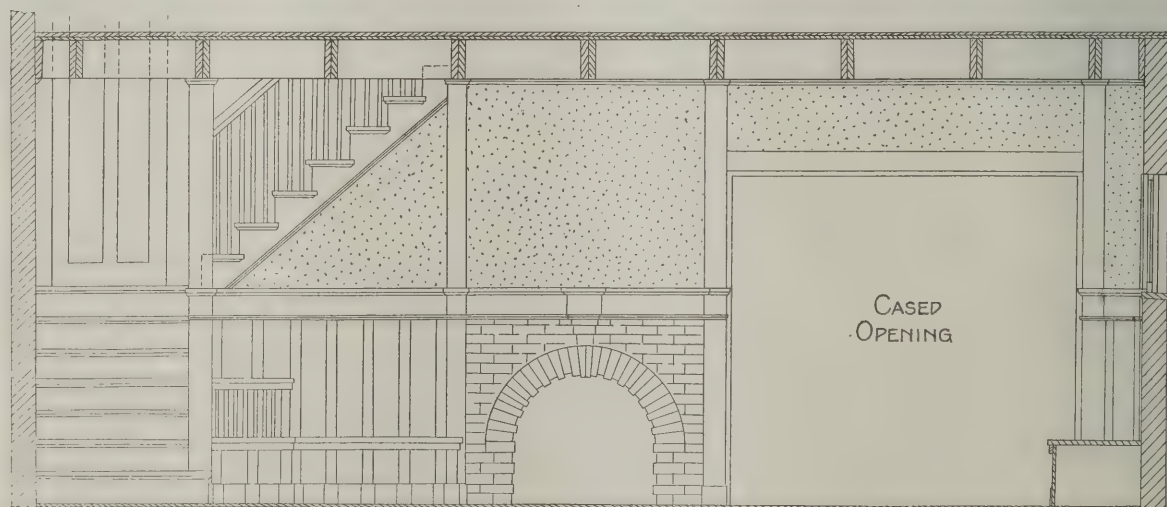
Details of Wainscoting in the Living Room—Scale $\frac{1}{2}$ In. to the Foot



Details of Stair Newel in Living Room—Scale $\frac{1}{2}$ In. to the Foot



West Elevation in the Living Room Showing Stairs and Seat at the Right—Scale $\frac{1}{4}$ In. to the Foot



North Elevation in the Living Room Showing Open Fireplace and Cased Opening to the Dining Room—Scale $\frac{1}{4}$ In. to the Ft.

The Attractive Home of a Kansas Architect—Miscellaneous Constructive Details

construction are very useful to the contractor in figuring his work.

There has just been issued from the office of Supervising Architect, Washington, D. C., a pamphlet in-

August 1, 1892, and the law approved June 19, 1912. The document has been brought out for the purpose of covering inquiries which are being received by the Supervising Architect relative to materials entering into the construction of public buildings.

A SUBSTITUTION OF BUILDING MATERIALS

Effect Upon Contract Rights—What Constitutes Substantial Performance of Work—Important Court Decisions Summarized

By A. H. L. STREET



ONE of the readers of *The Building Age* writes that he is involved in litigation under this state of facts: He constructed a church under specifications calling for "Acme" plaster, but, regarding all hard plaster as being alike, he used "Eagle" and "Ivory" plaster. He claims that the work constitutes a "perfect job," but the building committee of the church, without objecting to the quality of the work, rejected the work after it was nine-tenths done, though they saw the materials every day in the building for more than forty days and made no complaint. In these circumstances our correspondent requests our advice as to his legal rights; and, since the principles of law involved affect builders in general, the writer has prepared his answer in the form of the following suggestions, which are based on a careful review of American Appellate Court decisions.

Builder Is Entitled to Recover Contract Price.

The builder who propounds the above-mentioned query, on establishing the facts stated by him, is entitled to recover the contract price of the building on the ground that he substantially performed his contract, and on the further ground that strict performance as to the brand of plaster to be used was waived by the building committee.

As a general rule, before a builder can recover the price for work done under a contract, he must show that he has performed the work in substantial compliance with his agreement; to recover for work or materials substantially varying from the contract, he must disregard the agreement and seek recovery of the reasonable value of such work and services, if the owner of the building receives them and is benefited thereby. But it is only where there has been an honest intention to comply with the contract and it has been substantially performed or the work and materials are of value and benefit to the owner, and enjoyed by him, that the builder can recover their reasonable value.

Some Decisions Sustaining Principles Involved.

These principles are sustained by Appellate Court decisions which can be found reported as follows: 10 Atlantic Reporter 264, Conn.; 32 Southwestern Reporter (Tex.); 38 Pacific Reporter 749, and 49 Pacific Reporter 740 (Cal.); 59 Northeastern Reporter 247 (Ill.); 45 Northwestern Reporter 845 (Minn.); 48 New York Supplement 456, and 77 Northwestern Reporter 599 (N. D.) The courts hold that there is a substantial performance of a building contract, within the rules above stated, where a variation from the specifications is unintentional and unimportant, and one whereby the building is not injured, where the building is actually used after it is erected, for its intended purpose, where the defects can be remedied by the owner without large expense, and where it appears that the contracting builder intended to fulfill his agreement. This rule is stated by the Illinois Supreme Court in the case of Bloomington Hotel Company vs. Garthwaite, 81 Northeastern Reporter 714, as follows: A building contractor need not literally comply with his contract, in order to

entitle him to recover the price agreed upon for his work, it being sufficient that there has been an honest and faithful performance of the contract in its substantial parts, and no wilful departure from essential requirements. Unintentional and unimportant variations from the specifications, by which the building is not injured, will not defeat a recovery. (Connecticut Supreme Court of Errors, *Smith vs. Scott's Ridge School District*, 20 Connecticut Reports 312.) But one who contracts to construct a building according to certain plans and specifications does not perform his agreement by merely erecting a building equal in strength, value and convenience to that contracted for; to enable him to recover, any deviation must be slight. (*Fauble vs. Davis*, 48 Iowa Supreme Court Reports 462.) Deductions may be made from the contract price for small omissions or defects occurring in good faith. (New York Supreme Court, Appellate Division, *Van Orden vs. MacRae*, 105 New York Supplement 600.) In *Small vs. D. J. Lee & Brothers*, 61 Southeastern Reporter 831, the Georgia Court of Appeals states the rule thus: When a contractor has in good faith attempted to comply with his contract, though there may be slight defects caused by misconstruction of its terms, and the structure as built is reasonably suited for the purposes intended, the builder is entitled to recover the price, less the damage on account of such defects.

Practical Application of the Legal Principles.

Practical application of the legal principles stated above are well illustrated by the following summary of decisions: Under an agreement to decorate the walls, ceilings and woodwork of a room, etc., for \$5,200, defects in the woodwork afterwards developed but remediable at a cost not exceeding \$500, do not prevent recovery of the contract price, less a deduction of the latter amount. (United States Circuit Court, *Philip Hiss Company vs. Pitcairn*, 107 Federal Reporter 425.) In *South Congregational Meetinghouse vs. Hilton*, 11 Gray 407, it was held by the Massachusetts Supreme Judicial Court that a builder's agreement to use the "best French plate double-thick glass similar to that used" in a certain other building, requires use of glass of a fair sample of the quality specified, and not that each plate should be the best possible specimen of its kind.

It was decided in the Missouri case of *Marsh vs. Richards*, 29 Missouri Reports 99, that where a builder contracted to erect buildings with pressed brick fronts but used brick of inferior quality, the relative cost of pressed brick and the kind used was properly considered in ascertaining the compensation to be allowed. But in *Linch vs. Paris Lumber & Grain Company*, 14 Southwestern Reporter 702, the Supreme Court of Texas decided that in a suit for breach of contract to furnish a particular kind and make of columns, it could not be shown by defendant that the columns substituted for them were substantially like those called for by the agreement. And where a building contract called for laths $1\frac{1}{4}$ inches wide, for No. 1 rustic, and the best quality of joist and studding, and the contractor supplied lath $1\frac{1}{2}$ inches wide, No. 2 rustic and a second quality of joist and studding, it was held by the California Supreme Court in the case of *Golden Gate Lumber Company vs. Sahrbacher*, 38 Pacific Reporter 635, that there was such substantial breach of the contract

as warranted the owner in refusing to pay the contract price. Under a contract to install screens of bronze wire, fitted with Laramie checks, there was no substantial performance where "bronzed" steel wire, worth one-fifth the value of bronze wire, was used, and checks other than those called for were used. (Alabama Supreme Court, Higgins Manufacturing Company vs. Pearson, 40 Southern Reporter 579.) The ornamentation of a building is a matter of substance, and variations or omissions as to paneling, railings and cornices constitute a breach of the contract. (McEntyre vs. Tucker, 25 New York Supplement 95.)

Waiver of Strict Performance.

Strict compliance with the terms of a building contract is waived by any acts of the owner or his representative fairly showing intention not to make any claim on account of a departure from the contract. This principle is sustained by the decisions in the following cases: Bozarth vs. Dudley, 44 New Jersey Law Reports 304; Cosby vs. Adams, Wils. (Ind.) 342; Demoss vs. Noble, 6 Iowa Supreme Court Reports 530; and Boteler vs. Roy, 40 Missouri Court of Appeals Reports 234. Application of the rule, and especially as to such case as we have in hand, is illustrated by the decision of the Massachusetts Supreme Judicial Court, in the case of Hayward vs. Leonard, 7 Pick. 181. Plaintiff, a builder, in erecting house, varied from the contract in workmanship and materials, but defendant, the owner, was present almost every day while the building was in course of construction, with opportunity to see the quality of materials and workmanship furnished. Though objecting to parts of the work, he continued to give directions about the house. Soon after the building was completed he refused to accept it, but the builder had no intimation of his intention to do so until after it was finished. On this state of facts, it was held that the contractor could recover the reasonable value of the work done by him.

Reasons for the Existence of a Builders Exchange

The reasons why there should be a Builders Exchange in every important city of the country, and why every one associated with the building or allied industry should be a member thereof may be discussed from two points of view; namely, that of the builder himself and that of the community in general. In the Monthly Letter of the Secretary of the Master Builders Association of Boston, the reasons from the builder's standpoint are briefly summarized as follows:

First, those in a like occupation must associate for exchange of views; for personal acquaintance; for keeping a vital hold upon business; for creating *esprit de corps* and a feeling of oneness of interest throughout the building fraternity.

Second, methods, processes, materials, and individual relationships are in a state of change in the building business as in other lines. An association is an indispensable mechanism for keeping up with the times.

Third, the physical conduct of the building business makes a central meeting place of great value in carrying on daily work.

Fourth, as the builder is frequently threatened with infringement of his rights by various instrumentalities there is imperative and constant need for that character of protection which can only be afforded by an organization of those having a community of interest.

Fifth, Publicity. The existence of a centrally organized association in the community makes its presence known and its members known.

Sixth, to be known as a member of an association

which demands a high standard of character and ability for membership is an asset of the highest value.

Looking at the need for a Builders Association or a Builders Exchange from the viewpoint of the community, the following reasons are presented:

First, such an association offers an available avenue whereby the public may enter into relations with the builder, to consult or engage him.

Second, the existence of such an association, establishing a standard, makes the general public safe in employing members thereof. It also tends to raise the tone of the general building community.

Third, such a body stands ready to lend expert aid and assistance in its particular field to the State or to others who are seeking to better conditions.

Fourth, it acts as a center for furnishing information.

Fifth, the stability of the general body politic is increased by the presence of a builders' organization which stands for the best principles in the building business.

Sixth, not the least of the advantages is the fact that a Builders Exchange provides a favorable medium for conferences between architects and builders, thus permitting improvements in practice and the settlement of disputes through arbitration.

Best Architectural Work in the United States

The American Federation of Arts recently undertook to ascertain what were the most satisfactory examples of architecture in the United States and to this end invited an expression of opinion from a selected list of persons including members of the Federation, prominent supervisors and artists, sculptors and others having a reputation for taste. The result of the canvass showed the following twenty public buildings to lead the list, and of this list it will be observed that nine are in New York City:

Boston Public Library.
Capitol at Washington.
New York Public Library.
Pennsylvania Railroad Station, New York.
Trinity Church, Boston.
Columbia University Library.
Congressional Library, Washington.
J. P. Morgan's Art Museum, New York.
Minnesota State House.
Madison Square Garden.
St. Patrick's Cathedral, New York.
Cathedral of St. John the Divine, New York.
West Point Military Academy.
White House, Washington.
New York City Hall.
University of Virginia.
Toledo Art Museum.
Union Station, Washington.
W. K. Vanderbilt's House, New York.
Pan-American Building, Washington.

Following the initial twenty is placed the Metropolitan Tower, University Club and Trinity Church in New York City, and the Museum of Fine Arts in Boston.

America's First Safety Exposition

The first International Exposition of Safety and Sanitation to be held in America will take place in New York City, December 11 to 20 of the current year under the auspices of the American Museum of Safety. It is expected that at this exposition safety and health in every branch of American industrial life, manufacturing, trade, transportation on land and sea, and engineering in all of their subdivisions will be represented. The main object of the exposition will be to point the way to the conservation of human resources.

SOME FEATURES OF SCOTCH MASONRY

Free Use of Stone in All Building Construction—Work of the Mason
as Contrasted with That of the Bricklayer

By JOHN Y. DUNLOP

THE extent to which stone masonry is used in the construction of buildings in Scotland may be gathered from the fact that the smallest wayside cottage has at least its front of stone and in most of the districts, cottages and mansions alike are constructed of this material. There are, of course, excellent reasons for the free use of stone, since there is plenty of sandstone to be found in the surrounding sections. The stone is very durable, and ample evidence of the sandstone can be seen in buildings which have been erected as far back as the fifteenth century. Stone, therefore, is a material upon which the Scottish architect is compelled to spend a considerable amount of thought, the natural outcome of which is that the art of masonry is well upheld in Scotland.

The work of the mason calls for the continual exer-

Another point which should be carefully considered is that all beds and joints should be worked to true right angles or the pressure will be unequally distributed and cause fracture. Great smoothness in the bedding joints of stone is not desirable, as a slight roughness adds resistance to sliding and allows the mortar to better adhere. Most of the stones should be placed on their natural bed, although with some stones there is little or no advantage in this.

In masonry only fine mortar is admissible and the thickness of mortar joints in ashlar walls should be about $\frac{1}{8}$ of an inch for buildings of the better class. In first-class railway masonry such as bridges, piers and abutments the joints should be $\frac{3}{8}$ in.

Time should be allowed stone walls for setting and mortar to harden and all pointing done about six



An Interesting Example of Scotch Masonry in which the Walls Are Built of Uncoursed Rubble

cise of skill and judgment, for he has not, like the bricklayer, to deal with blocks of a uniform size, while the length, depth and height of the wall he is building is always fixed. The mason has always to bear in mind that whatever may be the quality of the stone to be used, the wall must consist of as much stone and as little mortar as possible. The writer, however, claims that about one-eighth the volume of ashlar masonry should be mortar, while rubble masonry per cubic yard requires one part stone to $1\frac{1}{5}$ to $\frac{1}{4}$ part of mortar.

The stones should never be allowed to actually touch each other and the bedding and jointing should be carefully studied so as to evenly distribute the pressure through successive courses. Hollow bedding is inadmissible or anything approaching to the forming of a "frog," as in brickwork, as too much of the weight is thrown upon the edges, which become liable to chip off.

months after the wall is built, as work done too early prevents the evaporation of moisture and does not allow time to absorb carbon dioxide from the air.

In the half tone engraving presented upon this page there is shown an example of uncoursed rubble, the walls being built with stones just as they came from the quarry, but care being taken to obtain them as uniform as possible. If good mortar is used walls of this class should be made $\frac{1}{3}$ thicker than would be required for a brick wall. Aside from the example of Scotch masonry the picture is interesting by reason of the treatment of its roof and the quaint effects produced by the partially hidden belfry.

The new Municipal Building in Dublin is to be of Irish granite with Portland stone dressings. Its principal frontage will measure 286 ft. and its depth 86.

AN EIGHT-ROOM HOUSE OF COLONIAL DESIGN

Compactly Arranged Country Home Suitable for a Family of Moderate Size—Estimate of Cost of Material and Labor

SYMMETRY is the basis of design in the house presented on the colored front cover of this issue of the paper, as an inspection of the elevations on the facing page will readily demonstrate. The gambrel roof is a variation of the simple pitch or gable effect and is borrowed from the Colonial mansions of New England. The Colonial effect is heightened by the presence of the green slat shutters at the mullion windows on each side of the main portal, which itself is Colonial in design and surrounded by an old-fashioned arch trellis.

Of the two porches, each 9 x 19 ft. in dimensions, one adjoins the dining room, and can be screened for use as a summer dining room and provided with a glass enclosure in the winter, while the presence of a fireplace makes possible the heating of it.

The architect recommends that the house be placed at least 40 ft. back from the sidewalk. The cellar covers the rear half of the plan, excluding the porches. The footings for the foundation walls are 22 in. wide and 10 in. in depth, the walls themselves being of concrete, 10 in. in width. The porches are supported on 12 x 12 in. concrete piers, with a concrete wall between the piers 6 in. thick.

The Chimneys

The chimneys are of common brick laid in good cement mortar, all flues being lined with vitrified flue lining. Chimney breasts below the mantel shelf are tiled with 4 x 4 in. dark red tile in the living room and 6 x 6 in. tile in the dining room. The hearths are tiled with dark red tile.

All timbers used in the building are of spruce. The sheathing is of hemlock laid diagonally. Floor beams are 2 x 8 in. and the studs 2 x 4 in., placed 16 in. on centers; the rafters are 2 x 6 in. placed 20 in. on centers; the plates are 4 x 4 in.; and the sills 4 x 6 in. The porch floor beams are 2 x 6 in. and the rafters 2 x 4 in., all placed 16 in. on centers.

The exterior walls are of white pine clapboards, painted a cream white with two coats of white lead. All sheet metal work is painted on both sides with two coats of red lead.

The roof is covered with red cedar, "Perfection," shingles laid in an uneven line exposed alternately 4 and 6 in. to the weather, and stained a moss green. All shingles are dipped in stain at least two-thirds of their length.

All floors are of North Carolina pine. The floors of the rooms in the first story are double, with floor felting between the rough and the finish floor. The second story floor is single.

The Trim of the House

The doors are of cypress, while the frames of doors, windows and sashes are of white pine. The windows are glazed with double thick American glass of the best quality. All trim is of cypress, finished in a simple manner. The wood casings are narrow and perfectly plain. The trim in the living and dining rooms is stained a deep golden brown, varnished and rubbed down to a smooth dull finish. The plastering in panels is painted a rich golden brown, with a flat finish. The plastering above the plate rail, and the ceiling, is painted a deep cream.

The stairway to the second floor is conveniently placed in relation to the living room and at the same time gives access from the first floor bedroom to the

bathroom on the second floor without the necessity of passing through any other room. The stairs are well lighted by a window at the platform landing.

All the interior walls of the building are plastered two coats with a sand finish, except on the second floor, where they have a hard smooth finish.

The walls of the rooms on the first and second floor are painted. In the kitchen the walls are painted a light delicate blue and the ceiling is finished in pure white. All trim in this room is painted two coats of white enamel. The pantry is finished similar to the kitchen.

The bedroom on the first floor has a built-in seat adjoining the French casement windows. The walls are painted a pale lavender, the ceiling white, and the trim white enamel.

The Second Floor

On the second floor the bedrooms are finished with white enameled trim, and doors and the ceilings are painted white. The side walls in front bedrooms are painted a pale pink and those in the rear bedrooms a pale blue. All floors are varnished and waxed. The hardware is of a dull bronze finish.

All plumbing is of the best material and the exposed pipes have a nickel-plated finish. The bathroom is provided with a wash basin, bath tub, and water closet. The kitchen is provided with brown glazed earthenware wash tubs and iron sink, also a combination coal and gas range with a 40-gal. galvanized iron boiler overhead.

The house is wired for electricity and piped for gas, and combination gas and electric fixtures are installed.

The specifications provide for the furnishing of a steam heating plant of sufficient size to maintain an interior temperature of at least 70 deg. F. when it is zero outside.

The kitchen is so arranged that the pantry keeps the odors of cooking from the dining room, living room and bedroom.

Following is an estimate of cost of material and labor for the house here described:

The house contains 24,426 cu. ft., which would allow a unit cost of 14 cents to bring the cost within \$3,500.

Cubical Contents:
Size of house, 25x36 ft. x (approximate height) 26 ft.
= 23,400 cu. ft.
Size of porches, 9x19 ft. x 2 porches x (approximate height) 12x1/4
of total cubage = 1,026 cu. ft.
Total, 24,426 cu. ft.
24,426 cu. ft. at 14 cents per cubic foot equals \$3,419.64.

The estimated cost of some of the more important divisions of the work is as follows:

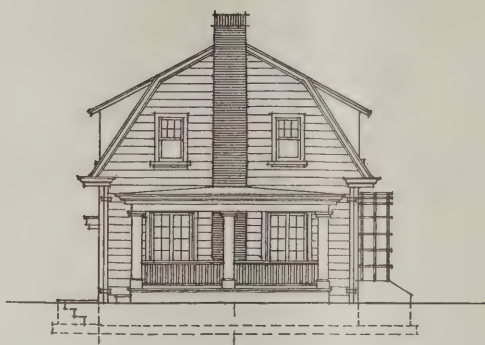
Excavating and grading.....	\$130.00
Masonry work, including concrete footings, foundation walls, chimneys, and fireplaces.....	400.00
Plastering interior.....	330.00
Carpentry work including lumber bill, mill work, etc.....	1,455.00
Hardware.....	75.00
Metal work.....	180.00
Plumbing and gas fitting.....	280.00
Heating.....	250.00
Electric wiring and bellwork.....	75.00
Painting, staining and tinting.....	255.00
Combination lighting fixtures.....	60.00
	\$3,490.00

The above figures include the contractor's 10 per cent. profit.

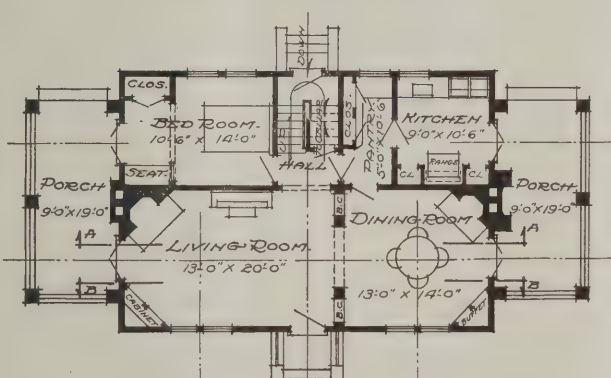
The house was designed by Arthur Weindorf, Architect, care of *The Building Age*, or Long Island City, N. Y.



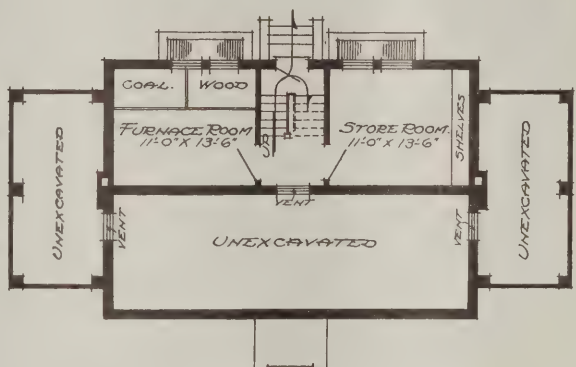
FRONT ELEVATION.



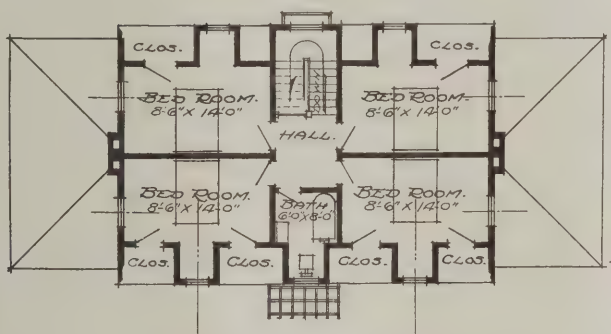
SIDE ELEVATION.



FIRST FLOOR PLAN.



CELLAR FLOOR PLAN.

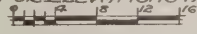


SECOND FLOOR PLAN.



REAR ELEVATION.

SCALE FOR ELEVATIONS AND PLANS.

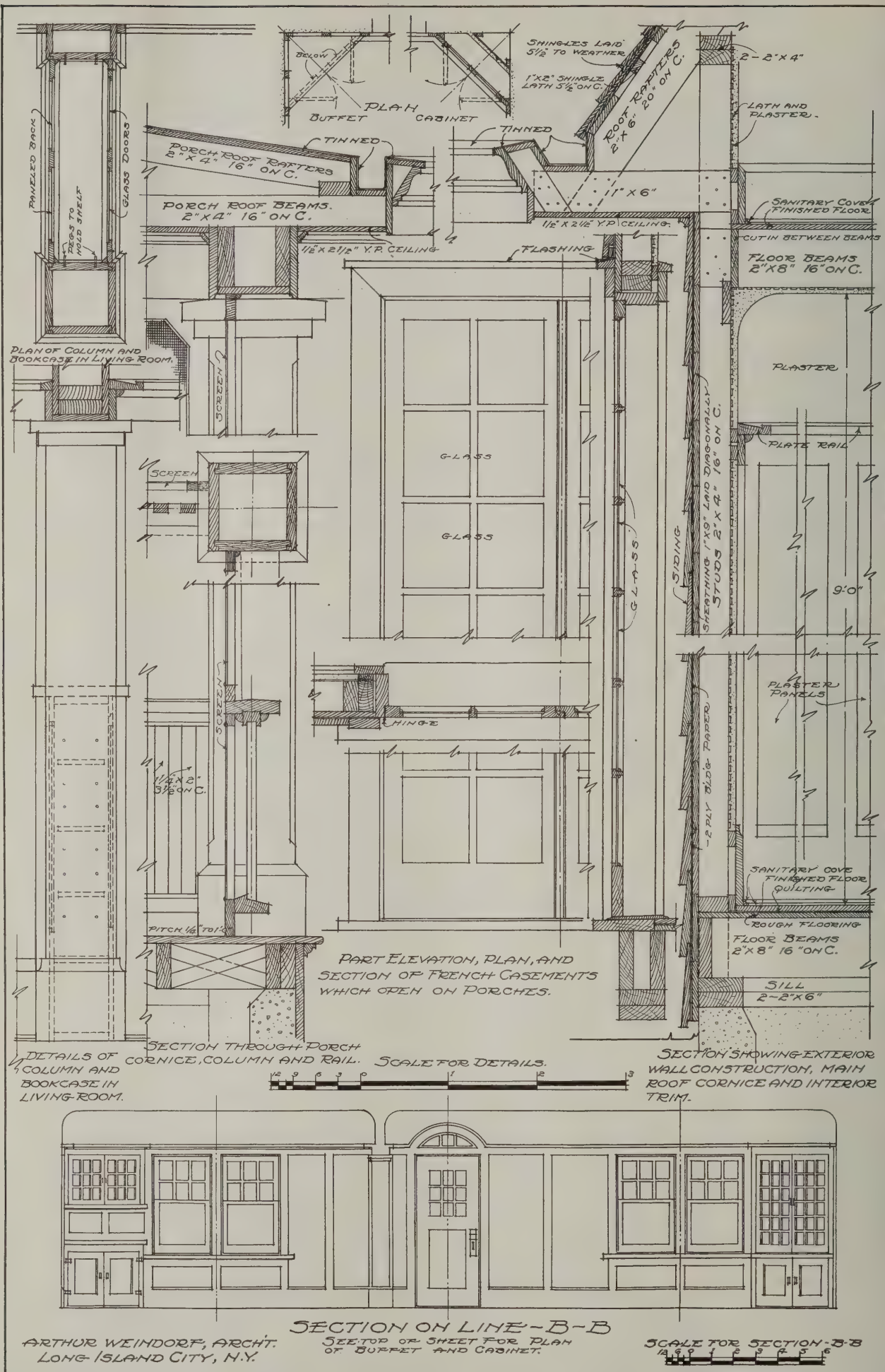


SECTION ON LINE A-A

SCALE FOR SECTION A-A.



ARTHUR WEINDORF, ARCHT.
LONG ISLAND CITY, N.Y.



ARTHUR WEINDORF, ARCHT.
 LONG-ISLAND CITY, N.Y.

SECTION ON LINE-B-B
 SET TOP OF SHEET FOR PLAN
 OF BUFFET AND CABINET.

SCALE FOR SECTION-B-B
 1 1/2" = 1'-0"

SOLUTION OF A PROBLEM IN HAND RAILING

A Well Known Stairbuilder Tells How to Lay Out a Hand Rail
the Center Line of Which Is 3 in. from the Wall

By MORRIS WILLIAMS

IN looking over the many queries which have appeared in recent issues of the paper I noticed in the May number a problem in hand railing presented by a correspondent signing himself "A. E. K., Lowell, Mass., and with a view to affording him a solution of the problem I present diagrams and explanatory text which I hope will give him just what he wants.

Fig. 1 of the sketches requires but very little explanation. It represents the plan, elevation and pitch line of the tangents all in their correct relative position. I have placed the rails upon the nosing line for the purpose of getting suitable easements as shown at 1 and 6 where the joints are also indicated.

By the arrangement here shown all we need to develop the face mold is indicated in Fig. 2. Draw a

reversely, both being the same owing to the tangents being equal. They are found as shown in Fig. 1 by touching the tangent at 3 from the point o.

Fig. 4 is a view of the wreath after it has been squared ready for molding and should be of great service to those not familiar with this kind of work.

In Fig 5 is shown a method which does away with the easement in the upper rail as shown at 5; the upper tangent 3-4 being made to pitch the same as the flight above. The remaining operation will be found similar to that in Fig. 1.

Owing to there being two pitches for the tangents it will be necessary to have two different spring bevels to square this wreath. They are found as shown at m and x by touching the two tangents from the point z.

They are applied reversely to the joints as shown at 5 and 7 in Fig. 6, which represents the face mold. This is drawn by an operation similar to the one shown in Fig. 2.

The face mold is presented in Fig. 7 in its position upon the tangents as indicated in Fig. 5 above the line X-y. It is here presented as an additional help to an understanding of the operation. The elliptic curves in this figure are drawn by means of a string and pins. The points for the pins (foci) are here shown as found by a strictly geometrical solution, as follows: Place the length of

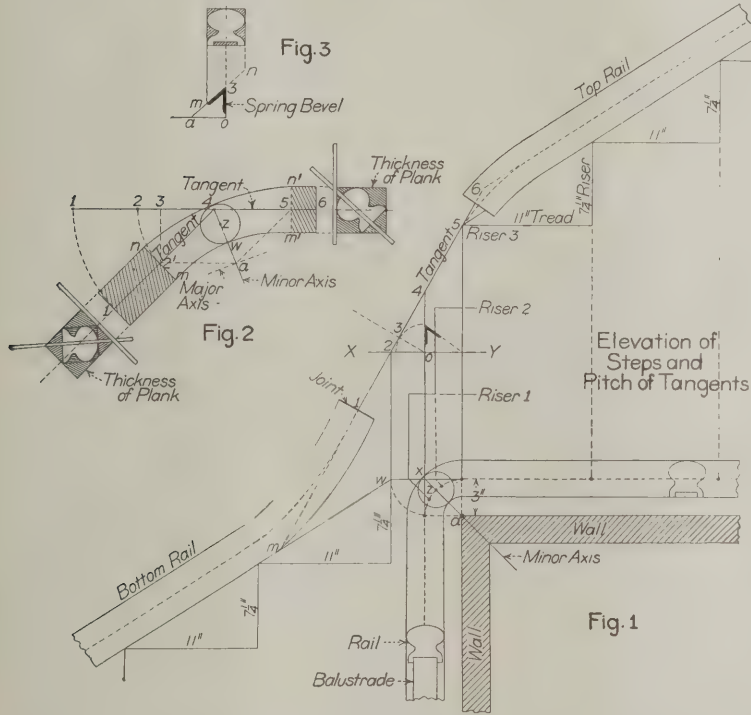


Fig. 1—Plan, Elevation and Pitch Line of Tangents—Scale 1/16 In. to the Foot
Fig. 2—Development of the face mold
Fig. 3—The Spring Bevel

line 1-2-3-4-5-6, the exact duplicate of the line from 1 to 6 in Fig. 1. From 3 draw a perpendicular line of indefinite length; place one leg of the compasses in 4, extend the other to 2 and turn around as shown to 2'. Now join 2' with 4 and this will be the bottom tangent. The upper one is the line 4-5.

Make the shanks 5-6 and 2'-1 equal to 5-6 and 2-1 of Fig. 1.

Draw parallel lines to the tangents meeting in the point a and connect a-4 for the minor axis. Make a-z on the minor axis equal to a-z of the plan, Fig. 1. Draw the circle to represent width of the plain rail.

Make m-n and m'-n' at 2 and 5 respectively equal to m-n upon the long edge of the bevel shown in Fig. 3. Now take a flexible lath and bend to touch n-4-n' for the outside curve and m-w-m' for the inside curve.

The spring bevels are shown at each end and applied

the minor axis of the outside curve as indicated from d to the intersection point of the minor and major axis in the compasses; fix one point in b and extend the other to cut the major axis in the point n. Draw a line from b through n to cut the minor axis in the point w. This line from b to w determines the exact length of the semi-major axis.

Now place this length in the compasses; fix one point in d on the minor axis and sweep the arc S-S to cut the major axis where the pins are shown.

The semi-major length for the inside curve is shown from a through m, cutting the minor axis in the point o, the full length being from a to o. Place this length in the compass, fix one point in c on the minor and turn around to cut the major when the pins are shown.

A study of Fig. 8 will be of great help in squaring the wreath where it is shown to be kept throughout in

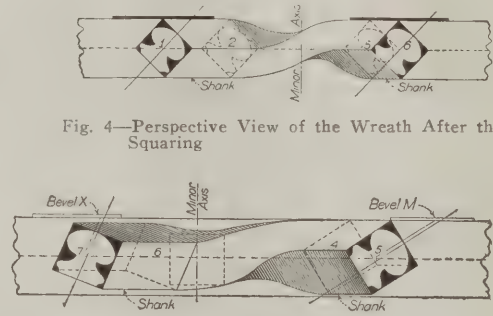


Fig. 4—Perspective View of the Wreath After the Squaring

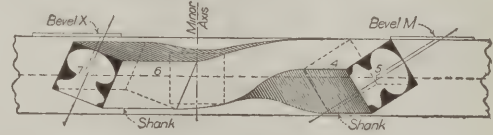


Fig. 8—Wreath for Fig. 3 After Being Squared

Solution of a Problem in Hand Railing—By Morris Williams

CONSTRUCTING A SILO ROOF OF CONCRETE

The Reinforced Type Much in Favor—The Mixture Used—Size of the Reinforcement and Tables for the Silo Walls

THE subject of silo construction is one of wide interest at the present time, more especially as so many of these important adjuncts of farm buildings are being erected throughout the country. In the majority of cases perhaps reinforced concrete is used for the reason that the materials of which it is made give greater satisfaction in the long run than it is possible to obtain by the use of wood or brick alone. Some silos are built without a roof, the owners claiming such a covering to be unnecessary, while others find by experience that the roof is fully as important as the walls. An interesting example of the manner of constructing a silo roof of reinforced concrete is illustrated herewith, the roof being built without any beams or crossties underneath, as the reinforcement takes care of all stresses.

The roof thickness for any silo up to 10 or 12 ft. in diameter need be only 2 in. and for a roof 20 ft. in diameter it need be only 3 in. thick. In fact, if a saving in concrete is desired the roof may be 3 in. thick at the edge of a 20-ft. silo and 2 in. thick at the apex.

The roof is not poured as is customary with concrete, but the material is plastered on top of the forms. The concrete used for the roof is really a mortar, the aggregate being material that will pass through a one-quarter inch mesh. The conical shaped form is first put in place and given a heavy coat of whitewash, or is thoroughly soaked with water, or well greased so the concrete will not adhere to it. The reinforcement is placed and then the mortar is put in place with trowels and well worked, like a sidewalk. A mixture of one part of good Portland cement to two parts of clean, graded sand, the grains ranging in size from $\frac{1}{4}$ -in. to material passing a No. 50 mesh, is made rather wet and great care is taken in placing it, for it will be exposed

the circumference. The vertical weight per square foot multiplied by the radius in feet gives the pressure per



Fig. 3—Covering the Reinforcement with Concrete

foot of width of roof. The difference is constant per foot. For a roof 20 ft. in diameter there will be required a $\frac{5}{16}$ ths inch round rod or a $\frac{3}{8}$ ths inch square bar around the outside, bent in the form of a ring and with the ends lapped at least 25 times the thickness of the steel and tied together with wire.

This will do for roofs between 17 ft. and 20 ft. diameter. For roofs from 12 ft. to 16 ft. diameter use one $\frac{3}{8}$ ths inch round rod, or $\frac{11}{32}$ nds square bar. For roofs from 8 ft. to 11 ft. diameter use $\frac{5}{16}$ ths inch round rods, or $\frac{1}{4}$ -inch square bars. For roofs having diameters up to 7 ft. use $\frac{1}{4}$ -inch round or square rods or bars. No

other reinforcement is required to take care of the circumferential stresses, but something is required to bind the concrete together and take care of temperature stresses. For this purpose expanded metal has been proven to be all that can be desired. The No. 103 with the long way of the diamonds placed in the circumference has been found to be sufficient, or the No. 153 placed with the long way of the diamonds vertically on the slope as shown in the picture.

The edges should be tied together with wire at every corner or the sheets may be laid down without the edges being tied and a ring of ordinary No. 12 wire can be laid on the reinforcement at each foot in diameter. The expanded metal thus binds the mortar in every direction and makes a stiff roof, while the rings of No. 12 wire furnish the necessary additional circumferential reinforcement. If wire is used to furnish all the reinforcement then the mesh can be very light indeed, as light as the company can furnish in the three-inch mesh. Nothing smaller than a three-inch mesh should be used, for a small mesh cuts up the concrete too much and it is hard to secure the requisite density. If the builder wishes to reinforce a roof with wire alone he can proceed as follows: For a diameter of one foot he should use one ring of No. 12 wire.



Fig. 1—Appearance of Finished Roof



Fig. 2—Roof Reinforcement in Place

to great variations in temperature and must not crack. The weight of the roof and any load that may come on it acts vertically and is converted into tension around

For each additional foot in diameter use one wire and around the edge place two wires. The stress varying directly as the radius the difference per foot is constant, so that starting with the required amount of reinforcement and adding a constant quantity for each foot increase in diameter the full amount is obtained. With this wire, however, should be used a mesh so that there will be steel not more than three inches apart all over the roof to prevent weather cracks.

The following matter relating to the reinforcement of concrete silos has been taken from Bulletin No. 21 of the Association of American Portland Cement Manufacturers. The tables of reinforcement can be used for cast concrete silos, or for concrete block silos, the reinforcement being placed in the latter between the blocks, in the mortar joints.

The correct reinforcing of the silo walls with small steel bars or steel wire must be done with accuracy

wire; also for 3/8-inch steel bars, for any size of silo. Referring to Table "F," the vertical or upright reinforcing necessary for a 10-foot silo, 25 feet high, is found to be one 3/8-inch rod, running from top to bottom every 30 inches around the silo, or 1 strand wire gauge 000, spaced every 36 inches. or 1 strand wire gauge 2, spaced every 19 inches. or 3 strands wire gauge 5, spaced every 36 inches. or 3 strands wire gauge 8, spaced every 22 inches.

TABLE G.

SIZE AND SPACING OF HORIZONTAL REINFORCEMENT AROUND SILO												
Distance in Feet Measured from Top of Silo.	For Silos 10' to 13' Inside Diameter.				For Silos 14' to 17' Inside Diameter.				For Silos 18' to 20' Inside Diameter.			
	Spacing in Inches and Number of Strands Used for Different Gauges of Steel Wire.				Spacing in Inches and Number of Strands Used for Different Gauges of Steel Wire.				Spacing in Inches and Number of Strands Used for Different Gauges of Steel Wire.			
	Spacing in Inches for 1" Mild Steel Bars and Number of Bars Used.	Gauge No. 000.	Gauge No. 2.	Gauge No. 5.	Spacing in Inches for 1" Mild Steel Bars and Number of Bars Used.	Gauge No. 000.	Gauge No. 2.	Gauge No. 5.	Spacing in Inches for 1" Mild Steel Bars and Number of Bars Used.	Gauge No. 000.	Gauge No. 2.	Gauge No. 5.
0' to 5'	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"
5' to 10'	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"
10' to 15'	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"
15' to 20'	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"
20' to 25'	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"
25' to 30'	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"
30' to 35'	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"
35' to 40'	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"	1-18"

* American Steel and Wire Co.'s gauge 1" inch bars are round, # inches in diameter.



Constructing a Silo Roof of Concrete—Fig. 4—The Silo Completed

and care, as the strength of the silo depends on the correct use of steel in the walls. The silo walls are reinforced in two directions—vertically, to prevent failure due to wind pressures, and horizontally, to prevent failure due to the pressure of the silage. Silage is a heavy material and is estimated by the various State experimental stations to exert a side pressure of 11 lbs. per square foot for every foot in depth. It is on

Table "G" shows the horizontal or "hoop" reinforcement around the silo and the vertical distance it is to be spaced apart in the silo walls. Since the pressure in a silo increases with the depth, it is necessary to make the walls much stronger at the bottom than at the top. The silo walls are divided into 5-foot horizontal sections up to 40 feet in height and the distance in inches between the bars or wires is given for each section, as well as the number of strands of wire to be placed at one time. Thus, in the 10 x 25-inch silo being described, if No. 5 gauge wire were purchased, it would require from the top of the silo down 5 feet, one strand of No. 5 wire every 16 inches in depth. For the section of wall between 5 and 10 feet from the top, one strand of No. 5 wire should be placed every 11 inches in depth. For the section between 10

TABLE H.

NUMBER OF GAUGE OF WIRE.*	DIAMETERS		SECTIONAL AREA IN SQ. INCHES.	WEIGHT IN POUNDS PER FOOT.	LENGTH IN FEET PER POUND
	Fraction of inch.	Decimals of inch.			
000.....	3/32	.3625	.103210	.3505	2.853
2.....	1/16	.2625	.054119	.1838	5.441
5.....	1/8	.2070	.033654	.1143	8.750
8.....	3/16	.1620	.020612	.0700	14.290
Steel bars	1/2	..	1104	.375	
		..	1960	.668	
		..	.3070	1.044	

and 15 feet from the top, one strand of No. 5 wire should be placed every 7 1/2 inches in depth. For the section between 15 and 20 feet from the top, one strand of No. 5 wire should be placed every 6 inches in depth. For the section 20 to 25 feet down, or, as the silo is only 25 feet in height, for the bottom 5-foot section, two strands of No. 5 wire are placed every 9 inches, making this part of the silo wall the strongest of all.

The same gauges of wire are figured in Tables F and G, so that only one size of wire may be used for all the reinforcement, although it will be slightly cheaper to order the heavier gauges for the lower sections of the silo and the vertical reinforcement and the lighter gauges for the top sections.

In no case should the horizontal bars or wires be placed over 18 inches apart or the vertical bars or wires be placed over 36 inches apart.

Table "H" shows the different sizes of the wire gauges used. From it the weights and length of wire or steel bars can be figured.

The photographs of the silo roof shown under construction were furnished by the North Western Expanded Metal Company, Chicago, as indicating the use of their expanded metal in this work.

TABLE F.

SIZE AND SPACING OF VERTICAL REINFORCEMENT.												
HEIGHT OF SILO IN FEET	For Silos 10' to 13' Inside Diameter.				For Silos 14' to 17' Inside Diameter.				For Silos 18' to 20' Inside Diameter.			
	Spacing in Inches and Number of Strands Used for Different Gauges of Steel Wire.				Spacing in Inches and Number of Strands Used for Different Gauges of Steel Wire.				Spacing in Inches and Number of Strands Used for Different Gauges of Steel Wire.			
	Spacing in Inches for 1" Mild Steel Bars and Number of Bars Used.	Gauge No. 000.	Gauge No. 2.	Gauge No. 5.	Spacing in Inches for 1" Mild Steel Bars and Number of Bars Used.	Gauge No. 000.	Gauge No. 2.	Gauge No. 5.	Spacing in Inches for 1" Mild Steel Bars and Number of Bars Used.	Gauge No. 000.	Gauge No. 2.	Gauge No. 5.
25' and under.	1-30"	1-36"	1-19"	3-36"	3-22"	1-30"	2-36"	3-31"	6-36"	1-17"	1-21"	2-22"
25' to 30'	1-19"	1-24"	2-25"	3-23"	6-28"	1-25"	1-30"	2-34"	3-31"	6-36"	1-17"	1-21"
30' to 35'	2-30"	1-16"	3-26"	6-32"	9-29"	1-18"	1-24"	2-34"	3-31"	6-36"	1-17"	1-21"
35' to 40'	2-19"	2-24"	3-18"	6-23"	12-28"	2-27"	1-16"	3-26"	6-32"	9-30"	1-17"	1-21"

Note: American Steel and Wire Co.'s gauges used.
bars are round, # in diameter.
No figures are given for silo 18' to 20' in diameter less than 35 feet height, or silo 14' to 17' in diameter less than 25 feet high, as these are not good proportions for silos.

the basis of this estimate that all the calculations in Tables "F" and "G" are based. The vertical reinforcement consists of tie rods running from the top of the walls down into the footing. The horizontal reinforcements are hoops. There are many kinds of patented reinforcing bars, but these offer no great advantage over plain round bars or wire for silo reinforcement. Tables "F" and "G" show the spacing for the reinforcement when using several different sizes of steel

ARCHITECTURAL MODELS AS BUSINESS PROMOTERS

The Full Value of an Accurately Made Model Is Fully Appreciated
by British Builders and Architects

By FRED. W. BURGESS



MODELS have already found a place in business enterprise. Ever since it became possible to realistically represent existing buildings, models of those which have been planned and designed but not erected, also of idealistic schemes for the development of estates, have been used with considerable success by architects and real estate firms. Architects have employed the builder of a model to work out to scale important erections before they have been actually put up, often saving considerable sums of money by preventing the necessity for alterations during building operations. Estate agents have shown such models in their windows, graphically picturing how estates and houses will ultimately look when fully developed according to preconceived plans. The exploiters of new areas, garden cities and the promoters of town planning schemes, have had models made from which prospective speculators and builders have been induced to take part in the enterprise.

to the inch, covering an area of 8 ft. in length. In the foreground there is the sea—the broad Atlantic stretching across to the American shore, and in the model is included a steamer approaching the pier, while overhead is an up-to-date monoplane.

Those who have given due consideration to town planning schemes are convinced that the cardboard model supplies the missing link. Such models give architects, builders, and builders' merchants an insight into the future possibilities of a town and neighborhood which no amount of argument could give. It is the link between the advertisement in printers' ink and the preparation of the plan in the draughtsman's office.

The large illustration shown herewith represents a beautifully executed model of the lay-out of an estate, where a model railway has been introduced. Situated in an out-of-the-way place it would be impossible for buyers of such an estate to form an accurate idea of its appearance, or of its value without the assistance of this modern phase of commercial enterprise.

Models may with equal success be used by the manufacturer to acquaint his customers with the extent of his



Architectural Models as Business Promoters—Interesting Example of a Suburban Estate

Great impetus has been given to the use of models in England by the improved way in which they are now constructed and worked out to scale—accuracy in every way being guaranteed. One of the most successful young men as a model builder is Berthold Audsley, son of Dr. Audsley, who is well known in the United States as a writer upon art, mechanical, and scientific subjects connected with the building world. The models are made entirely of cardboard and beautifully executed in colors. One of these delightful models, which has been photographed for reproduction in *The Building Age*, is executed exclusively of cardboard, with the exception of the small columns in the doorway, and the glazing of the windows. It was worked out to a scale of one-fourth of an inch to the foot, and, as will be noticed, is a modern development of Elizabethan and Tudor architecture, the overhanging woodwork being beautifully carved in deep relief and faithfully reproduced in cut cardboard.

One of the most successful models executed represents the town of Blackpool, and is now on view in London, the result of municipal enterprise, showing the possibilities of further development of that go-ahead town. It is constructed on the minute scale of 40 ft.

works. They may also be used to show the application of some new invention, especially of improved building materials, builders' ironmongery, ventilating schemes, chimney cowl, rainwater goods and metallic casements. There is no limit to the application of models for the benefit of commerce in the building trades.

An article on models would not be complete without a brief mention of the extreme value of such lasting mementoes of buildings about to be pulled down. As an instance, in the new London Museum there is an interesting model of the old Elizabethan house and shop which once stood at the corner of Chancery Lane and Fleet Street, and was occupied by Izaak Walton, the early exponent of the "gentle art" of fishing. Wealthy Americans who have bought old English houses just as they stood, and have removed them to their American estates, have oftentimes regretted that they had nothing but drawings and plans to show them what the building was like. They would have been saved many mistakes had they had an exact model before them for their builders to copy.

It is stated that Honolulu is erecting new buildings at the rate of more than \$2,500,000 a year.

EFFICIENCY IN THE SMALL WOODWORKING SHOP

An Excellent Example of What Can Be Accomplished Along
This Line in an Up-to-Date Builder's Shop

By G. D. CRAIN, JR.

THE builder and carpenter-contractor who takes the attitude that only the big fellows in the business can have shops that are really up-to-date, and that the man who employs only two or three men in his establishment is thereby condemned to old-fashioned methods, makes a grave mistake; because, as a matter of fact, the fewer the number of men which the business will support without straining, the more real necessity there is for machinery to make their work count for more. Further, the modern power unit is so flexible that it is a small business indeed which cannot economically use a few machines operated by power.

There is nothing like a good example, however, to demonstrate the truth of a general statement; and in this case the assertion that a comparatively small woodworking shop can be made as modern as the largest factory, in all essential respects, and that at no great cost, compared to the results gained, can be substantiated by the highly efficient shop which constitutes the basis of this article. The concern operating the establishment is by no means the smallest, because it is not what could fairly be called a "one-horse" shop; on the other hand, neither is it in the larger class, as compared with the really big fellows, whose mechanical departments resemble complete planing-mills. It is in fact just such a woodworking shop as is within the reach of any builder who wants to become more prosperous, even without any increase in the bulk of his business; and the man who fears to attempt to modernize his woodworking plant on account of the expense may find a hint or two worth while in what here follows.

This is more especially true by reason of the fact that the concern has grown from small beginnings. The men composing it have been in business in Louisville for twenty years, and when they started many of the machines now in general use in well-equipped carpenter shops were not known, while others were only rarely seen in any except the big shops; whereas at this time the shop, while not of the largest, is admirably fixed as far as mechanical equipment is concerned. In other words, it has grown with the business, equipment being added as the work called for seemed to require; which is the logical as well as the conservative way to keep investment in equipment at a reasonable figure.

It should be borne in mind, however—and this is one of the points to be made here—that many a shop is trying to get along with far less equipment than its volume of business would warrant, and buying from the mills all material which its limited supply of tools could not turn out. The mills, of course, are entitled to their profit, and this, in turn, comes out of the builder's margin; which is one good reason why it is worth

his while to consider the real economy of following the example of the firm here referred to.

The machines now in use in the shop—that is, in the machine room—comprise the following, located in the order given, from left to right, as shown on the plan of the shop: Jointer, rip-saw, combination machine, band-saw, molder or "sticker," boring machine, and planer. The combination machine is of the make of J. M. Marston & Co., of Boston, Mass., and the others were made by the American Woodworking Machinery Co. at its Montgomery, Pa., branch. The room in which these machines are placed is 18 x 46 feet, and is in the rear of the bench-room—22 x 50 ft.—which fronts on the street. The office is also in the front, at the side of the bench-room, and is 13 x 16 ft. in size.

One of the advantages of the machine-room, to begin with, is that it is extremely well lighted. It is plentifully provided with windows on four sides, even the side adjoining the bench-room being provided with a wide door, which, when not open and giving a full flood of daylight, admits light through a couple of sash at the top. This makes artificial lighting unnecessary, inasmuch as it is not the custom of the company to do night work, and there is practically never a day so dark as to make the natural light insufficient.

This is a point well worth noting, as it is obvious that it is not possible to do as good work in an ill-



Efficiency in the Small Woodworking Shop—Interior View in Machine End of Shop Looking From Right-Hand Corner Toward the Band Saw Clearly Shown at the Left

lighted shop as in one where there is plenty of light, especially of the natural variety. The two halftone engravings here given afford views of the interior of the machine shop end of the building.

In this well-equipped shop one man, with occasional assistance in rush times, does all of the machine work, going from one machine to another and turning out finished material as the needs of the business call for it; and when the really large amount of business handled by the concern is considered, this fact speaks volumes for the efficiency of machinery as compared

with the relatively slow progress which could be made on the same amount of work by men using hand-tools, not to mention the fact that they could not begin to turn out the variety of mouldings, trim, and other finishing materials which the shop is capable of producing with its present equipment.

The company operating this shop—P. Wirth & Sons, incorporated, Louisville, Ky.—do a general house contracting and building business, handling residence and

carpenter to do lots of clever things with only a few hand-tools. They do not let the fact that a machine bears one name deter them from letting it do the same work which might be done by another machine bearing a different name.

For example, while a tenoner is a very handy thing to have around a builder's shop, it is not by any means entirely indispensable. In the Wirth shop its work is done very satisfactorily by a cross-cut saw, which is, of course, readily adjustable, so that a satisfactory degree of exactness is possible. In like manner, the band-saw, besides performing its usual functions, takes the place of a jig-saw; for while it is of course incapable of performing the more delicate work which can be done with the jig-saw, the decorative work can be so designed as to come within the possibilities of the larger saw.

The cross-cut saw, which is provided with a set of six saws of different sizes, can also be used in certain kinds of molding work, as well as for ripping, on occasion; and by substituting a properly designed bit for the saw, the same machine does some kinds of grooving very satisfactorily.

A flooring machine would probably not be a good investment for the average small shop, by reason of the fact that it is cheaper to procure flooring from plants which make a specialty of it. This is, therefore, one of the few kinds of stuff required in a house which the Wirth shop does not turn out. Mantels, of course, are another, as are also sash and doors of the stock sizes. Here, again, the factory product can be produced cheaper in the regular run of goods, although the shop can make both sash and doors on special order just as well and almost as cheaply as any factory, and has frequently demonstrated its ability to do so.

The power for the operation of the machinery in the shop is furnished by a 10-h.p. motor, for which current is supplied by one of the public service companies operating in the city. This comparatively small power unit would of course be too small to run all of the machinery in the shop on full load, but inasmuch as it is never necessary to operate all of the machines at once, this is no disadvantage, and enables a decided



*Efficiency in the Small Woodworking Shop—Plan—
Scale 1/16 in. to the Foot*

other jobs running as high as \$10,000; and when it is understood that the shop, with the equipment indicated, can and does turn out everything needed for such a job in the way of wood-work, the versatility, so to speak, of the machinery described is apparent. Also, the profit which lies in being practically independent of the mill for all of the various finishes which are required in a frame house, with the exception of sash and doors, can be seen to be considerable.

In order, however, to turn out such a variety of work, it is of course necessary to use a little head-work in the application of the machinery available. For example, a larger shop would doubtless be equipped with a tenoner, a flooring machine, sand-papering machines of various sorts, a jig-saw, groover, a panel raiser and possibly others, in addition to the equipment which has been indicated by the remarks that appear above.

For the most part, however, the functions of these are performed with the equipment which the Wirth shop now possesses. The fact that machines are available for most uses has not deprived the Wirths of the same sort of ingenuity which enables the ordinary



View in Machine End of the Shop Looking Toward the Sticker

economy over the cost of sufficient power equipment to handle all of the machines simultaneously.

Power cost, for current, runs usually from \$15 to \$20 a month; the maximum would not exceed \$30, if the motor were run at full speed every working day, which is seldom the case. Moreover, it is interesting

to note that several years ago a 5-h.p. gasoline engine furnished the power, the cost of fuel running about the same as that for current, although only about half the power was developed, as the shop at that time did not have the molder or planer, both of which consume considerable power when running. This indicates the economy of the use of electricity, although in sections where current is not available a gasoline engine would probably be found sufficiently economical, with a careful use of the machinery in order to avoid running any of them when not actually required.

Besides the machine operator referred to above, two men are kept busy in the shop on bench work, and one of the Wirth brothers acts as office man and shipping clerk. In actual building work anywhere from ten or twelve to fifteen men are employed. Six shop trucks are used in moving lumber and finished material around, and two heavy hand-trucks at the yard.

One of the most substantial economies accomplished by the fact that the shop turns out all finishes and trim used in its building work lies in the fact that lumber can thus profitably be purchased in carload lots. The company has a yard located on a switch, and at its shop yard and receiving yard has dry storage capacity for 19 carloads, and total storage capacity of 100 cars.

Owing to the fact that the use of electric power eliminates to a large extent the fire risk inseparable from the operation of a woodworking plant, the company has not thought it necessary to provide a blower

system to take care of the sawdust and shavings. It is very careful, however, to have this litter cleaned up every evening, the refuse being placed in a bin outside the shop, so as to be entirely free from any fire hazard.

Getting rid of the waste of the shop is particularly important on account of the fact that the motor which operates the machinery is located in the basement, the shafting being run beneath the floor, and belts connecting with the machines leading up through openings made for the purpose. This is a desirable arrangement, because it gets rid of the inconvenience and accident hazard which is caused by having overhead belting and other transmission equipment; but, on the other hand, it emphasizes danger from fire which is caused by allowing sawdust and other small particles of wood to accumulate, since these are inflammable, especially if they happen to be oil-soaked from drippings from the machinery. Consequently the care taken by the concern in disposing of the waste regularly is commendable from all standpoints.

The refuse thus created is made a source of revenue, a good deal of the sawdust being sold to neighboring owners of horses for use as bedding. Some of it is used for the same purpose in the company's stable, where three horses are housed, two of these being used in hauling lumber and the third on the buggy and job wagon of the company. A motorcycle is also found to be very handy in getting round to the various jobs which are at a considerable distance from the shop.

EARLY HOUSE BUILDING IN SOUTH AFRICA

Some Strange Customs Regarding the Building of Dwellings—Weatherproof Qualities

IN the old days, that are not really so very long ago, when the Boers first migrated into what is now the Transvaal, it was arranged amongst the "trekkers" that any of the party who should desire a certain part of the land could claim it by erecting a dwelling-house on it, and, as soon as the house was completed, the land for a specified distance round it it became his property. It often happened that several of the pilgrims fancied the same land, and each, with the aid of his family, set to work to erect a dwelling. In this case the man whose building was completed first received the property, and the losers, in a spirit of revenge, invariably pulled down the buildings they had erected. This pulling down was an easy matter, as the structures were "rushed" up at a speed that would astonish anyone conversant with the ordinary lethargy of the Boer.

Very often disputes occurred as to the weatherproof nature of the houses so put up, and the leaders of the "trekkers" were called in to adjudicate in the matter, says a London contemporary. Many of these old houses are still standing, and the owners of the land on which they stand, who, of course, have now other and more commodious dwellings, point them out with pride to visitors and describe how their grandfathers "bought" the land by putting up the house. Some of these old houses have been turned into "guest-rooms," much to the disgust of the older people, for according to all tradition the "guest-room" should be the most comfortable and ornamental apartment. As guests, however, are few and far between in the rural districts of the Transvaal, this is not such a serious matter. It is the modern spirit of breaking away from old associations that causes the remonstrance. Some of these old houses are long, low buildings, the predecessors of the modern Boer homestead, others of different shape. The shape did not matter, the main object

being to satisfy the judges. It is said, however, that these worthies possessed all the acquisitiveness that is charged against the Boer, and were not always above accepting a gift, and that "a good beast (ox) and a bad house often went together." But possibly this is a libel.

Curious Business for English Architects and Contractors

The following literary curiosity appeared in a recent issue of the London *Builder*, having been forwarded to the editor of that paper by the Secretary of the Society of Architects. Obviously the name and address of the firm are omitted:

ARCHITECTS and CONTRACTORS,

Plans and Specifications prepared and Land Surveying carried out on Moderate Terms.

PROPERTY VALUED, CAREFULLY MANAGED AND DEVELOPED.

Rents Collected and Repairs promptly executed.

Concrete Flags and Staffordshire Fire Bricks on Sale.

Funerals Completely Furnished and personally superintended. Vaults and Brick Graves built on the shortest notice.

No doubt a funeral organized by an architect should have special merits in the eyes of many members of the profession.

The Master Plumbers' Association of Elizabeth, N. J., will hereafter make no estimates to general contractors for plumbing, heating or sheet metal work, but will deal only with the owner direct.

A FRAME COTTAGE WITH EXTERIOR OF STUCCO

Good Example of the "Mission" Style of Architecture—The Living Room the Central Feature of the Plan

THE old Spanish "Mission" style of architecture is the predominant *motif* in the design of the house illustrated on this page. The stucco exterior, the dormer windows, the shingled roof and the generally home like appearance of the cottage are among its noticeable features.

Three broad steps lead to the piazza, 8 ft. wide, which extends across the entire front of the house. The dining room is 12 x 20 ft. 6 in. with a stair hall at the left of the front entrance door. An open fireplace at the end of the living room is a noticeable feature of this apartment. A broad opening affords communication between the living room and the dining room, the latter being 10 x 12 ft. 6 in. in area and is lighted by two windows clearly shown in the half tone

lighted by three windows opening toward the front of the house. Each bedroom is provided with three windows on the side wall and a closet, and is entered from the study.

The cellar extends under only a portion of the house, there being a concrete foundation and a concrete trench wall under the remaining portion. The concrete used in the work was mixed in the proportions of one part Portland cement to two of sharp sand and five of gravel. The cellar is floored with concrete 3 in. thick.

The flue for the open fireplace is $8\frac{1}{2} \times 13$ in., and for the remaining portion $8\frac{1}{2} \times 8\frac{1}{2}$ in., lined with fireclay.

The framing is of spruce and North Carolina pine. The sills and posts are 4 x 6 in.; the floor timbers, 2 x 8 in.; the rafters, 2 x 6 in., and the inside studs.



* A Frame Cottage with Exterior of Stucco—Photographic View Showing the Completed Structure

engraving on another page. A door leads directly from the dining room in to the kitchen, which is well lighted by a window in each of the two outer walls. The bath room adjoins the kitchen, thus concentrating the plumbing fixtures. Entrance to the bath room is through a door from the living room.

Two bedrooms equal in size are each entered from the living room. The front bedroom is well lighted by two windows in the front wall, opening on the porch and one window on the side. The rear bedroom is lighted by a window at side and rear, and both rooms are provided with clothes closets.

The second floor is occupied by a study, two bedrooms and a store room. The stairway from the floor below leads directly into the study. The latter is

2 x 4 in., the latter being placed 16 in. on centers. All framing is doubled for partitions and for openings of over 3 ft. in width.

The outside frame is covered with $\frac{7}{8} \times 8$ in. sheathing boards. The roof is covered with 6 x 20 in. Roper's white cedar shingles laid $6\frac{1}{4}$ in. to the weather.

The exterior walls are finished in stucco. The sheathing boards on the exterior frame are covered with two layers of "Neponset" building paper made by Bird & Son, East Walpole, Mass., and over this is placed metal lathing of "Toncan" metal, made by the Stark Rolling Mill Company, Canton, Ohio. To this is applied a brown coat of 1 to 4 Portland cement, after which a splatter-dash coat of 1 to 2 cement is applied.

The floors of the first story are double, the rough

floor being of $\frac{7}{8}$ x 8 in. lumber, and the finish floor of $\frac{7}{8}$ x $2\frac{1}{2}$ in. hard pine, dressed and varnished. The rough flooring is omitted in the second story and the finish flooring is the same as that in the first story.

The interior trim of the living room and dining room is of oak with doors to match. That of the balance of the house is of Oregon fir, painted white and with birch doors, stained in imitation of mahogany.

All outside doors are 2 in. thick with 2-in. sills of oak at the front and yellow pine at the rear door. The interior doors are $1\frac{1}{2}$ in. thick. The stairs are of oak with $1\frac{1}{8}$ in. tread and 1 in. risers, glued and wedged into the $1\frac{1}{4}$ in. wall stringers.

The windows are of the double hung type, the

for the cellar. Front and rear screen doors are also provided.

The roof shingles are brush-stained two coats. All outside woodwork is painted three coats.

This cottage was designed by the Architectural Department of the T. B. Ackerson Company, 1 West Thirty-fourth street, New York City, and was erected under its supervision at Brightwaters, New York.

Kitchens of Long Ago

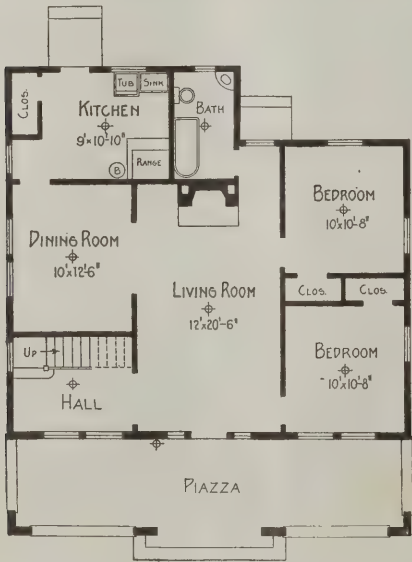
The kitchens of olden times seem to have been of extraordinary size, judging from the investigations recently made by an English historical society. At Hurstmonceaux, for example, there was a kitchen 28 ft. high, with three huge fireplaces, and a bakehouse with an oven 14 ft. in diameter.

There is an old Welsh kitchen near Llandudno, dating from the fifteenth century, which has many primitive culinary contrivances, now obsolete or superseded by modern devices, says a writer in *Harpers Weekly*. Among these curious old devices may be mentioned a meatjack with a flywheel, a steel toasting stand, and a fan bellows.

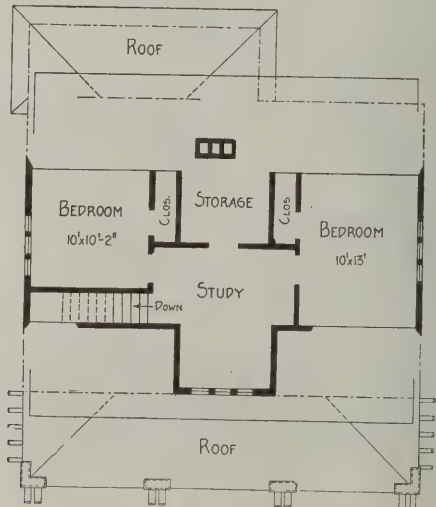
At Battle Abbey there is a curious old kitchen containing much of interest to the antiquary, and a kitchen at St.



Front Elevation—Scale $\frac{1}{8}$ In. to the Foot



First Floor—Scale $\frac{1}{16}$ In. to the Foot



Attic Plan—Scale $\frac{1}{16}$ In. to the Foot

A Frame Cottage with Exterior of Stucco—Plans and Elevation

sashes for which are made of No. 1 white pine. The rooms are plastered, three-coat work, with a hard finish troweled to a smooth surface for decorating.

The cottage is designed for hot water heating. The kitchen is provided with a hot water boiler, range, sink and an Alberene soapstone wash tub made by the Alberene Stone Company, 223 East Twenty-third street, New York City.

Plumbing fixtures are of the usual standard type, including porcelain-lined bath tub, water closet and lavatory with nickel-plated piping where exposed.

The house is wired for electric lighting. Screens are supplied for all windows, as are also shades, except

Mary's Hall, Coventry, is remarkable for the famous "knaves' post" to which, it appears, refractory scullions were temporarily attached by way of punishment.

There is a medieval kitchen at Westminster Abbey, although little remains by which to identify it aside from the rubble flooring, the buttery hatch and an adjoining cellar. Hampton Court Palace shows its "great kitchen," with vaulted roof and sets of antlers on its walls.

Englishmen of other days fully recognized the advantages of a large kitchen. There is extant an order, dated April 19, 1206, wherein Hugh de Nevill is commanded to have the king's kitchen at Clarendon roofed

with shingles and to cause two new kitchens to be erected, one at Marlborough and the other at Ludgershall, in which "to dress" the royal dinners. In this



A Frame Cottage with Exterior of Stucco—View of One Side and Rear

order it is stated that "it is particularly directed that each kitchen shall be provided with a furnace sufficiently large to roast two or three oxen."

Saw Filing and File Using

"The average carpenter," said the mill man who had been studying the subject and watching an old gentleman file a hand saw, "may know how to file saws, but he doesn't know how to use files. Just listen to that file squeaking and squealing. It is enough to make a man's hair stand on end and put his teeth on edge. You never see a mill filer do anything of that kind. If he did use or abuse a file in any such manner he would not hold his job long."

"Yet, strange to say, about nine times out of ten the average carpenter with his abusive way of using a file can do a better job of fitting up a hand saw than can be done by a mill man with all of his skill in the use of files. I have tried time and again to find the secret of this, and all I can make out of it is that the mill man knows more about using files, but the carpenter knows more about how to file his saw. The carpenter gives no consideration whatever to his file, probably because his task is so tedious and the teeth are so fine. The mill man has saw teeth to work on that are large enough for him to get free play with his file and he can handle it like a workman, whereas the carpenter must center his concern on the saw teeth themselves, and the very nature of them is such as to make it difficult to give due regard to the care of his file."

"I watched a mill man file a hand saw and I have filed a few myself and have taken proper care to use files as they should be used, and I pride myself that I can do a decent job at hand saw filing, yet generally the average carpenter can make his saw cut keener and nicer than I can. In short, the average carpenter knows how to file a saw, but he doesn't know how to use a file."

"Another thing I am wondering about, too, is why they don't reduce this tedious work to a mechanical basis and use filing machines. We do it in the mills and we use them not only for the big saws, but for the little ones, even down to the small factory saws and the little band saws with teeth not any larger than those in the coarse hand saw, and we realize that we can get better results that way and keep the saw in better shape than when filing by hand. Some day the carpenters will do the same thing, and the only wonder is, it being such a tedious job, that they have not turned more to filing machines before today."

Compulsory Ventilation in Cleveland

In the new building code of the city of Cleveland provision is made for the regulation of the ventilation and heating of schoolhouses, tenements, theaters, department stores, the idea being of course to promote better conditions of hygiene in these buildings. Frequent air tests will be made by T. R. Quay, the city heating and ventilating engineer, to see that the ventilation provisions of the code, at least so far as public buildings are concerned, are carried out.

The code provides that halls, auditoriums, school rooms, theaters and other places of public assembly or entertainment shall have in continuous operation while occupied a system of ventilation that will provide at least 25 cu. ft. of outside air per minute for each person for whom seating accommodation is provided. Department stores shall have a mechanical system of ventilation that will provide the following number of complete air changes per hour: Basements used for retailing merchandise, locker rooms, rest rooms and other rooms that are required by ordinance to be ventilated, six changes of air per hour; ground floor, six changes per hour; floors above the first, four changes per hour, unless natural ventilation is provided.

A mechanical system of exhaust ventilation is required for kitchens connected with restaurants, that



Another Photographic View Showing the Street Front with Broad Concrete Walks and Picturesque Surroundings

will exhaust the air six times per hour. However, if the restaurant and its kitchen are not separate six changes per hour are required for both the restaurant and its kitchen. In factories in which there is less than 20 sq. ft. of floor space for each employee a mechanical system of ventilation is required that will pro-

vide six changes of air per hour. If more than 20 sq. ft. of floor space is provided for each employee a system of ventilation is required that will provide four changes of air per hour, unless natural ventilation is provided as required by the city ordinance. In hospitals, jails, asylums, homes for the aged, houses of correction and detention, etc., where there are sleeping accommodations for more than ten persons, ventilation systems are required that will provide at least six changes of air per hour in dormitories, cell blocks, wards, public sitting rooms, toilet rooms, and in other rooms where the inmates congregate.

System for Church Ventilation

Churches with a seating capacity of over 300, or where the clear story height is less than 15 ft., must have a mechanical system of ventilation providing six changes of air per hour. If the seating capacity is less than 300 or if the clear story height is 15 ft. or more a modified system of ventilation which shall meet the approval of the engineer shall be installed.

The amount of carbon dioxide in any new building in the foregoing classifications shall not be permitted to exceed 10 parts per 10,000 parts of air. The amount of carbon dioxide in buildings erected prior to the enactment of the code shall not exceed 12 parts per 10,000 parts of air. If tests of ventilation show that the percentage of carbon dioxide in the air is greater than the maximum prescribed the building inspector may require additional ventilation, even if the requirements of the code as to air changes have been complied with.

An exception to these standards of ventilation is made in the case of storage rooms and vaults or where manufacturing processes would be materially interfered with. However, the code provides that the air in such places shall not be permitted to become detrimental to health or safety.

No part of the fresh air supply is to be taken from the cellar or basement. No person shall be exposed to any direct draft from any air inlet. All poisonous or noxious gases and all dust which is of a character that is injurious to health in manufacturing plants must be removed by mechanical ventilation or exhaust devices.

Ventilation of Toilet Rooms

The code provides that the ventilation system for toilet rooms shall not be connected with any other ventilating system in the building, but shall be a complete system discharging above the roof. Compartments containing no more than four water closets and without sufficient outside windows must have a gravity or mechanical system of exhaust ventilation that will change the air six times per hour. Compartments with more than four water closets and having sufficient outside windows shall have a gravity or mechanical system of exhaust that will change the air six times per hour. In the latter case if the outside windows are insufficient a mechanical system must be used that will provide six changes per hour. Rooms containing latrines or urinals with local vents are to be ventilated through the fixtures, and when such ventilation does not provide six changes per hour additional ventilation must be provided. Wire or cloth screens are required for filtering air in all fresh air openings unless some other approved method is provided.

No floor registers will be allowed in any aisle or passage way excepting in churches and no register there shall be larger than 18 in. square. In theaters, churches, etc., at least one-fifth of the ventilated air shall be removed by registers located near the floor. No radiator coil or other heating surface shall be supported on any supply or return piping construction to the same, but must be carried on the floor or on hangers fastened to the floor, wall or ceiling.

Warm-air furnaces must be supplied with fresh air from outside of the building through a duct having an area of at least 60 per cent. of the area of all warm-air pipes. This fresh-air duct may have a by-pass connection to the vestibule or hall near an outer door, but no such connection shall be permitted for the use of air from the cellar. Floor furnaces are prohibited and those now in use must be removed within 30 days.

Mr. Quay was appointed to the newly created position of heating and ventilating engineer in Cleveland several months ago and has been engaged in preparing the ventilation regulations which will become a part of the city building code. The provisions of the code have been very carefully compiled and classified under 37 sections, with numerous sub-heads so that any particular regulation can be quickly found.

Treatment for Damp Walls

A painter being called upon to treat a damp wall gave it four coats; first a size, then a coat of flat paint, then a coat of shellac varnish and finally a coat of flat color, yet with all this the moisture still continued to come through. He wrote about his trouble to the *Painters Magazine* and received the following suggestions with regard to the necessary treatment.

If the dampness comes through the wall from the outside the cure must be applied on the exterior of the wall. In that case the wall should receive two coats of a good oil paint after a spell of dry weather. If the dampness, however, does not come from the outside, you can make a damp-proofing liquid by placing in a suitable vessel ten pounds of air slaked lime, two pounds glucose (grape sugar), one-half pound powdered alum, one-half gallon boiled linseed oil and one pint oil of eucalyptus, adding two gallons hot water gradually, while stirring until all is dissolved.

If this liquid on cooling is too stout to work freely under the brush, add more warm water. You can mix with this liquid any lime-proof pigment, such as zinc or lithopone, Venetian red, ocher, umber or lime blue, using the mixture in place of paint. Never use shellac varnish on damp walls, but you might try in place of the liquid referred to plaster of paris wet up with weak glue size and alum solution.

Poured Concrete Houses in Southern France

Something like 120 houses for the workmen employed by a French company are to be constructed of "poured" concrete after a system which closely approximates that suggested by Mr. Edison. We understand that the methods which will be used in this connection were designed by Harns & Small, two engineers who are said to have been at one time among the collaborators of Mr. Edison. The houses will be erected at Gard, France, where the head office of the company in question is located.

The mechanical properties of redwood are considered in Circular 193 just issued by the Forest Service of the United States Department of Agriculture. The circular presents the results of a series of tests made to determine the mechanical properties of the wood in question and were conducted at the laboratories of the Forest Service in co-operation with the University of California at Berkeley, and with the University of Washington at Seattle. The stringers and joists used in the tests were furnished by the California Redwood Association. The circular was prepared by A. L. Heim, engineer in forest products.

SOME DETAILS OF TOOL CHEST CONSTRUCTION

Less Tools Required by the Carpenter of the Present Day than Was the Case Years Ago Hence a Smaller Chest for Them

By C. J. GOODRICH

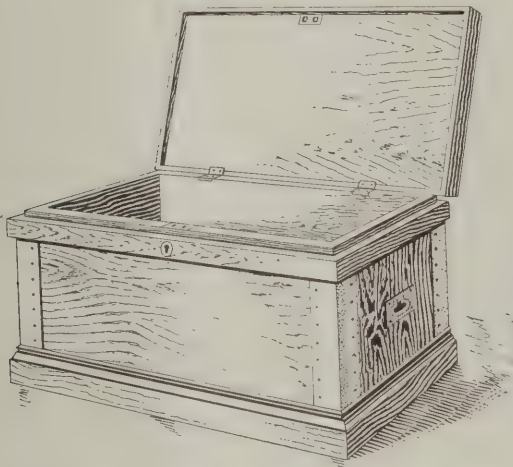


REQUENTLY some reader of the paper requests information regarding tool chest construction, and occasionally drawings of a tool chest with descriptive data are given in the Correspondence Department of this most excellent journal. Many of these designs are very good, some having more merit than others. "Many people, many minds" means various ideas of the proper construction of a tool chest.

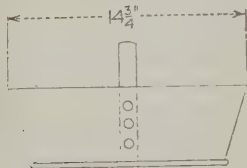
Years ago two or three carpenters or perhaps only one or two would do the entire work on a house, except of course the masonry work,

vided with a larger tool chest than would be required by the average craftsman of the present time, especially those living in the city. I would much rather employ a carpenter who learned his trade in the country than one who learned or partially learned it in the city, for the reason that the former can do any portion of the work required.

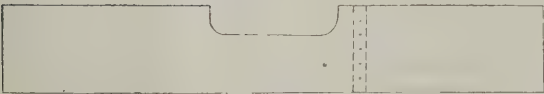
This, however, is digressing from my subject. Some years ago, I think it was in November, 1892, I was the author of an article on tool chest construction illustrated with drawings and published in *Carpentry and Building*, as the journal was called at that time and which was known by that title so long that it seemed almost a sacrilege to change it. The chest described was a commodious affair with many drawers and tills for the various tools then carried, including many



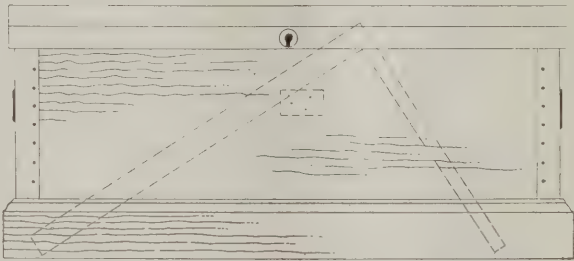
Perspective of Tool Chest with Lid or Cover Raised



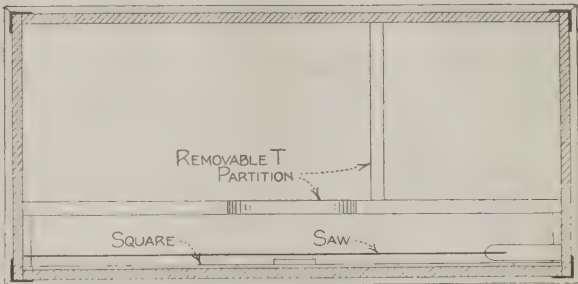
End View of Tool Tray



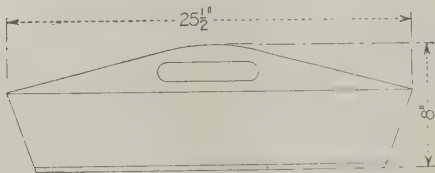
Side View of "T" Partition



Front Elevation of Tool Chest with Steel Square Shown by Dotted Lines



Plan of Tool Chest Showing Position of "T" Partition



Side View of Hand Tool Tray

Details of Tool Chest Construction—By Charles J. Goodrich

and would begin by hewing the timber with a broad-axe and finishing the interior with hand-made moldings and panel work. Such carpenters understood carpentry and joinery from A to Z. They had a much better general idea of the trade than the present-day so-called carpenter. The present is a day of specialties; one man oversees the rough work and general exterior, while another attends to the roofing, and still another the flooring, etc.

It can readily be seen therefore that the carpenter of many years ago required a much larger assortment of tools than the man of to-day; hence, he was pro-

molding tools required to do work in those days.

I am now going to describe a very simple box, smaller in size than the one above referred to, although larger than the average in use at the present time. It is, however, as small as it can be and fully cover the requirements of the case.

By referring to the sketches presented herewith the reader will readily understand how very simple and easily cleaned is this chest. It is simply a well-made box 15 in. wide, 14 in. deep and 34 in. long inside measurement with a removable T-shaped partition 5 1/2 in. high set on the bottom of the chest and held in

place by two thin cleats or strips secured to the two front corners of the chest. By considering the tools to be carried in this box one can see why these measurements were adopted. The depth is as little as will take the ordinary size steel square with 24 in. blade and 16 in. tongue; just long enough to take in a 30 in. hand timber saw and wide enough to receive a good size hand tool tray.

With a desire to make this chest cheaper and lighter than the one first described, I rabbeted the ends and cross nailed the joints at the corners, after which I covered the corners with strips of galvanized iron bent in the shape of an angle iron and closely nailed at both edges with round headed escutcheon nails.

A molded base strip was put around the bottom, also a $\frac{1}{2}$ in. thick strip was run around the top of the box and around the cover to make a waterproof joint. The chest is provided with strong hinges and a good lock.

In front of the T-shaped partition and against the front panel is placed the steel square; then the 30 in. hand saw, the level, the hatchet, the pinch bar, etc. A blue print rolled up can easily be placed on top.

The rear right-hand space is used for a box of pod bits, box of German bits, oilstone, oil can, extra rule, pencils, etc. In the left-hand rear portion are placed planes, chisels, bit brace, etc.

Now over these tools and resting on the partition is set the hand tool tray filled with the tools most commonly used—not above mentioned—as they are returned from work.

The beauty of this arrangement is that when one "picks up" for the night he takes the steel square and timber saw, if he has been using them, and places them in their respective places, then he simply sets the hand tray containing the smaller tools into the chest together with apron, overalls, etc., locks the chest and it is quickly ready for the home march.

If, on the other hand, the tray does not fit the chest the carpenter is obliged to remove every tool from the hand tray and return them to the chest, which of course requires several extra minutes—more precious to the average carpenter, I am sorry to say, than the same time during working hours.

From this description and the drawings presented in connection herewith almost any enterprising mechanic can easily duplicate the chest if he so desires.

The Ventilation of Picture Theatres

Our Special British Correspondent writes us in reference to the very successful application of what is known as the "Dupor" system of ventilation to picture theatres. The great possibilities in connection with moving pictures and color displays has taken hold of the British public, and they throng in thousands to the new picture palaces which are being built all over England. Incidentally it would appear that the moving picture displays, and those newer applications of science which render the screen unnecessary, have not only been made use of to represent laughable incidents and current events, but business men are using them as advertising mediums.

Such theatres necessarily need ventilation, for in an exhibition where science is seen in the most up-to-date manner it is only reasonable to suppose that the manager and the builders will be up to date in lighting, heating and ventilation. Among the different schemes which have been applied mention should be made of the "Dupor" system, a very important installation of which was carried out recently at the Maida Vale Palace, London—a splendidly appointed building. It may be explained that "Dupor" means duplicate power, and the patentees have earned their success by the application of mechanical means aiding natural laws, that

is to say, while acknowledging that the principle of natural ventilation is the right one, it is recognized that it requires assistance under exceptional conditions.

The system adopted in this particular instance is the use of a powerful cone and extractor known as the "Barrol" which draws upward all foul air and gases through main trunking to a central shaft, from whence it is carried through the roof into the open air, the natural ventilation of the inlet coming in at a suitable distance above the floor. When this remains stagnant powerful electric fans are brought into operation, sucking the air upwards into the cone. They are economical in use in that they cease working the moment the up-draught is sufficient without their aid. The fans are regulated, too, so as to prevent any superfluous draught.

In the particular instance referred to there are three small fans over the gallery, the central pit being ventilated by one large one in the centre. The system has been found very satisfactory, and is being adopted in England in many of the picture palaces that are springing up everywhere.

New Types of Fireproof Partition

An order lately emanating from the Fire Prevention Bureau of New York City required greater fire-resisting efficiency around elevator shafts, particularly in factory and commercial buildings. In carrying out this order many unique problems had to be solved, and one which is worthy of more than passing attention is found in the partition which has been installed around the four main elevators at No. 26 Broadway. The partition in question is constructed of steel and wire glass and was fitted in between the ornamental up-rights and railings already in place. The partition was erected without blocking traffic or interfering with the business of those occupying the building, and among the advantages claimed for this type of fireproof partition is that it is readily adaptable to existing construction, while giving a maximum of light with a minimum amount of space required.

Mexican Roofing Tile

Mission roofing tile, so extensively used in Mexico, is made by hand, according to Vice-Consul A. G. Brown, at Mazatlan. A simple mold is used and the tiling is formed into the molds by hand, the laborers being very adept at this. These tilings are made by contract, the makers being paid about \$4 per thousand. The contractors make them on the ground, and hauling to market and cost of wood for burning in up-draft kilns must be added to the contract price. These tiles bring on the market \$9 to \$10 per thousand. Recently a machine was bought locally for making tiling, but the business had to be given up on account of the lack of demand for this article in any great quantities.

According to a bulletin recently issued by the Agricultural Department at Washington relating to wholesale prices of commodities the figures show that last year lumber and building materials decreased in price 2.1 per cent. This does not prove that the cost of building has decreased this amount for the reason that the cost of other things entering into the erection of a building more than offsets this.

The Balkan War has brought about a rise in certain lumber prices in Europe because of the big demand for wood for ammunition boxes.

INTERESTING LITTLE CHATS WITH BIG BUILDERS

Comparison of Methods of Present-day Builders with Those of the
"Old School," as Given by a Milwaukee Contractor

"TO be a successful builder, no matter where you are located, it is essential to advance with the times and endeavor to compete with others on a substantial basis, with your own work to stand as evidence of your capabilities. The modernists of the building fraternity have advanced so much during the last few years that a careful system of estimating should be an important part of any man's business should he wish to make a profitable showing on contract work."

So said Henry Ferge, a Milwaukee builder of forty years' experience, to a representative of *The Building Age* when discussing the methods of present day builders and those of the old school. An excellent likeness of Mr. Ferge is presented herewith.

Among the building fraternity in the Cream City Mr. Ferge is recognized as an authority on structural matters on account of his activities and accomplishments as a general contractor during the past twenty years. Like many successful builders, his knowledge of building construction was acquired by actual experience, for as a young man the art of carpentry attracted him so much that he adopted it as a basis for his life work. His early devotions to carpentry have served him well in undertakings ranging from barns and residences to mammoth post-offices, and his advice to the young men in the building game is: "Give your mind to your work, study, and read your trade papers."

A strong talk of Mr. Ferge's concerns the improved methods that prevail and their effect on estimating. He maintains that a great many of present-day contractors fail in their work because they are not entirely familiar with up-to-date methods and improvements. He also believes that organization among master builders has done much to enlighten members by the exchanging of ideas, and the unanimous adoption of rules and ordinances that have a tendency to improve conditions among master builders have only been made possible by the co-operation of broad-minded, far-seeing, and progressive association workers.

As an active member in association work, Mr. Ferge has been especially prominent. The presidential chair of the Builders' Association in Milwaukee has been graced by his form for a term, and as organizer and first president of the Builders' Club he has established an enviable reputation as a "booster" for Milwaukee generally.

When the building ordinances were framed in Milwaukee, Mr. Ferge represented the building interests, and many ideas of his convinced the commissioners that they were practicable enough to be included in the city's laws. A recent edict issued by Building Inspector Harper says that all assistant building inspectors must fill out time cards recording their movements at all times throughout the day. This will be a means of maintaining the good name that the building department of Milwaukee already has.

Mr. Ferge believes that in undertaking any kind of construction work a contractor should realize that he is in business to make money and that his price should be fair to himself and to his client. "The contractor that is a plunger might make good for a while but in the end he will lose out. If a contractor is confident that work he undertakes will be finished up in a creditable manner, then he is entitled to a fair margin of profit the same as any other business man. If all those affiliated with the building trades would realize that, I am convinced that it would benefit all concerned and that a closer friendship would be apparent in the different branches of our industry."

Mr. Ferge has great hopes for Milwaukee's future and expects to be able to participate in its advancement. He has already taken a good part since the early nineties, and both he and Milwaukee have benefited materially as a result of a mutual friendship. Socially, Mr. Ferge has many connections, and, being of German descent, Milwaukeeans have flocked around him in such large numbers, both in social and business life, that he is assured of a fair volume of enjoyment and business throughout the rest of his days.



Henry Ferge, One of Milwaukee's
Successful Builders

Our Cover Design for September

We have selected for the embellishment of the front cover of the September issue of *The Building Age* a design representing a suburban home of rather quaint yet attractive exterior. The house is of brick and in the treatment of his subject the architect has carried the roof of the main building down over the porches at the right and left in a way to produce those long sweeps of surface which are both impressive and artistic.

The layout of the rooms is somewhat out of the ordinary and affords

a good basis for careful study on the part of the interested reader.

There are three rooms and reception hall on the main floor and four sleeping rooms and bath on the second floor. The design is by Mr. Fellner, whose work is already familiar to readers of this journal.

Cost of a Concrete House

Concrete houses, now distinctly recognized as among the safest, most enduring and sanitary of all now being constructed, are not expensive, their numerous points of excellence being taken into account. To the question, "How much does a concrete house cost?" no special answer can be made, since many things must be taken into consideration and conditions vary greatly with localities. In a place where the different ingredients that enter into such construction can be readily and cheaply assembled, the cost is quite low, but where freight or long haulage charges must be paid, this is, of necessity, decidedly increased.

The question of labor also cuts a decided figure,

wages varying greatly in different sections of the country and at different seasons of the year. The labor required to construct a concrete house is not of the high grade variety, which is one reason for the comparative cheapness of that form of building. On general principles increased familiarity with concrete work on the part of contractors will tend to decidedly decrease its cost. This is not peculiar to concrete, but applies to all the construction work in the world.

Constructing Concrete Houses on a New Plan

In Muskogee, Okla., they are building reinforced concrete houses on a new plan of form construction that is proving decidedly economical. A recent report, says the *American Contractor*, shows that one of these houses is 37 ft. deep, not including porches, and 16 ft. wide, with full basement, a living-room, dining-room and kitchen on the first floor, with pantry, coat closets and other conveniences, and three bedrooms and bathroom on the second floor. The plain concrete shell of one of these houses before any stucco finish had been put on the walls, or any interior work done, cost \$1,603. The walls of the house are double, with an air space between the two sections. On one of these houses \$800 additional was spent in terazzo floors, extra quality plumbing and in bush-hammering the outer surface of the walls instead of using stucco.

At Gary, Ind., about two hundred poured concrete houses are being built for factory operatives of the constructing corporation. Several types are being used. Single detached buildings of five and six rooms, and modern in all respects, are being erected at a cost of \$2,800 each. There are ten terrace houses with six rooms each, costing about \$16,000. There are four apartment buildings, two of the apartments having four rooms and two six rooms. These cost \$6,500 each. A three-story, ten-terrace building, nine rooms in each house, cost \$20,000. In most of these houses concrete floors have been built, and in part of them there are wood floors. The interior walls are of concrete, as well as the exterior walls, the inside walls being four inches thick and the outside wall eight inches.

Use of a Combination of Materials

A manufacturing corporation at Ludlow, Mass., has recently built a large number of houses for its employees. In these buildings various materials were employed, including wood, concrete block and shingle in combination and concrete block alone. The company, after a long experience, report that concrete block houses are by far the most satisfactory. The cost of such houses is only from 5 to 10 per cent. more than those built of wood, which, everything being taken into account, means that they are decidedly economical. Among those erected at Ludlow a typical house is described as 32.8 x 27.3 ft. in size, with full basement. There are eight rooms, hall, pantry, bathroom and closet space. The outside walls are built of 8-in. concrete block and the inside walls are furred, lathed and covered with hard plaster. The cost of these concrete block houses, which vary somewhat in the number of rooms, is from \$300 to \$350 a room. Most of these houses are much larger than cottages ordinarily built for such occupants. Foundations are of poured concrete.

Near Washington, D. C., poured concrete houses have recently been constructed at an exceedingly modest cost. These houses have a reception room 13 x 16 ft., a dining-room of the same size and a kitchen 12 x 13 ft., on the lower floor. The upper floor has three bedrooms, two 13 x 16 ft. and one 12 x 13 feet, and a bathroom. The cost of these structures was about \$2,000 each, a remarkably low figure when the average size of the rooms is taken into account.

A corporation that has been building concrete houses

for its employees at Rochester, N. Y., gives out very definite figures as to cost. These houses, which vary somewhat in the treatment of porches and exterior finish, thus doing away with a sameness of appearance, are constructed from one set of floor plans. They are two stories in height, with a ground area of 25 x 27 ft. They contain eight rooms, counting a spacious hall as one, and have a bath and attic. They are of poured concrete with solid concrete foundations and stucco finish. The report of the corporation shows that these houses have cost \$1,971.50, not including cellar excavation, while wooden houses of ordinary frame construction built with the same exterior dimensions have cost \$2,190.60, not including the excavation. The walls of the concrete houses are double, with an air space.

This is a remarkable record from an economical standpoint, but the construction conditions were unusually favorable. The materials for making the concrete were near at hand, while the workmen, going in a body from house to house and following the same general plans, became decidedly proficient, thereby greatly reducing the labor cost. This, however, is by no means exceptional, since groups of concrete houses are being thus constructed in all parts of the country. It is almost evident that the modest average residence of the future will come to be largely of concrete.

Chicago's Coming Cement Show

Arrangements are rapidly being completed for the holding of a number of conventions at the same time that the Cement Show will be held in Chicago in February, 1914. The plans of the National Association of Cement Users which will convene in the Auditorium Hotel, February 16 to 20, have already been announced by President Humphrey. Secretary E. S. Hanson of the Interstate Cement Tile Manufacturers' Association has completed arrangements for holding the convention of that organization in Chicago February 17, 18 and 19; the National Association of Sand and Gravel Producers will hold its next annual convention during the period of the Cement Show, as will also the Illinois Lumber and Builders' Supply Dealers' Association, the Illinois Association of Municipal Contractors, and probably several other organizations which are now considering the advisability of convening in Chicago during the period of the Cement Show.

An Old Dutch Windmill

There stands upon a farm in Smith County, Kansas, an old Dutch windmill which has been creaking away for the past 30 years, grinding grist for the owner of the farm and his neighbors. The mill is patterned after one in Germany in which the owner, C. G. Schwarz, worked when a boy. The Kansas mill is 50 ft. high and the paddles are 75 ft. from tip to tip. Mr. Schwarz built the mill unassisted, and it is said that many of the cog wheels are of wood fashioned by hand.

Newark, N. J., is contemplating its first twelve-story apartment house to be patterned after the residential buildings on Riverside Drive in New York City. A tentative plan of the proposed architecture has been prepared by A. F. Leicht, a New York architect, some of whose work has been illustrated in the columns of this journal.

The advantages of small cottages of concrete construction as compared with those of frame have resulted in the erection of a number of the former in Jacksonville, Fla., and others are contemplated.

CORRESPONDENCE

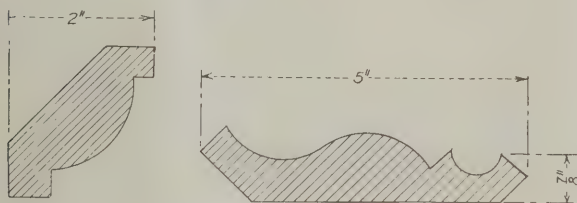
A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

Plans Wanted for Small Carpenter Shop

From C. W. L., Staunton, Ill.—I want to know if some of the readers will furnish for publication a number of plans for a small carpenter shop that is cool, well lighted, modern in appearance and suitable for the installation of a "Universal" woodworker or other light machinery, such as would be used in frame making. The subject is one which I think will prove interesting to many other builders besides myself.

Some Sizes of Rough and Dressed Mill Stock

From John Wavrek, Jr., Pennsylvania.—The article which appeared in your July issue and entitled "Architects Should Understand Mill Details" was written primarily with the idea of calling the attention of architects to a fault in their detailing which made considerable trouble to the planing mills and in the hope that they would see the matter in the right light and co-operate with the mills in overcoming the trouble if possible.



Some Sizes of Rough and Dressed Mill Stock

It is, therefore, very gratifying to note that the little seed thus sown has taken root and that some fair-minded readers have made comments on the subject. As a result of the suggestion of the correspondent "W. M. L." in the July number I have gotten out a partial list of sizes of stock in the rough and the practical finished dimensions.

In the case of hardwoods such as oak, birch, maple, etc., 1 in. stock will only hold out 13/16 of an inch after being surfaced, sanded and scraped. This fact should be carefully noted because the stock will not work thicker. In all the soft grades of lumber it is perfectly safe to figure that 1 in. stock will hold out 7/8 in. after being dressed and finished. Again, taking the 2 in. stock in the rough, it is perfectly safe to figure that it will allow of being finished to 1 3/4 in. thick in most all kinds of lumber. However, where it is required that the stock be perfectly straight, as in the case of door and sash stiles, the surest way to obtain good results is to detail the stock 1 5/8 in. This will allow of the stock being jointed on one side of its face and therefore producing a comparatively straight stile.

It is a well-known fact to all good carpenters that a crooked door stile is an abomination, to say the least, for it will not allow of the door being nicely fitted. The same trouble is experienced with sash. If the stiles are not straight they will not slide well and are an everlasting nuisance, hence to obtain a straight stile it must be jointed, and by the time this is effected the stock will finish scant; that is, 2 in. stock will finish but 1 5/8 in. thick.

There is a great saving of stock to be obtained in many cases of molding details. For instance, it is desired to show a bed mold of 2 in. projection. Instead of making the mold solid it should be made of 7/8 in. stock, as shown in the sketch. This mold does the same service and is far less expensive than a solid one.

Below will be found a list of stock sizes in the rough and also the finished thickness both for soft and hard woods.

Rough	Finished	Hardwood
1"	7/8"	13/16"
1 1/4"	1 1/8"	1 1/16"
1 1/2"	1 3/8"	1 5/16" a door finishes to 1 1/4"
2"	1 3/4"	1 11/16" a door finishes to 1 3/8"
2 x 4"	1 3/4 x 3 3/4"	
4 x 6"	3 3/4 x 5 3/4"	
6 x 6"	5 3/4 x 5 3/4"	

A 2 x 2 bed mold, as shown in the first sketch, made of 1 x 3 in.—1 in. stock—is sufficiently thick for the making up of 5 in. in width, as shown in the second sketch.

Remedy Wanted for a Damp Basement

From J. P. M., Atlantic City, N. J.—I am a reader of *The Building Age* and am desirous of finding a remedy for a damp basement which is 16 x 36 ft. The walls are 8 in. thick and are constructed of what is known as soft-hard brick. The basement is 7 1/2 ft. in clear. The floor is 6 in. from the ground and there is no water under the house. Things in the basement, however, soon become moldy. I want to know what I can do to overcome the dampness. The house is stripped and lathed inside.

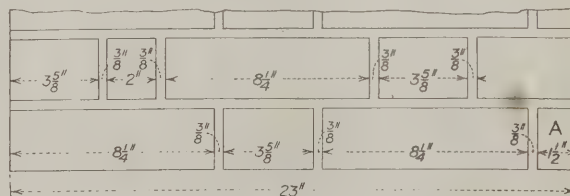
Building on the Percentage Basis

From W. L., Mineola, Texas.—Will some of the practical readers of the paper kindly give me the scale charged for making out all bills of materials and ordering the latter, hiring of help and looking after the job.

What is the per cent. charged and is it figured on the gross cost of the building or on the cost of the labor?

Flemish Bond in Brick Work

From E. G. H., Atchison, Kansas.—I would like to ask the mason readers of the paper the correct way to lay



Flemish Bond in Brick Work

the Flemish bond in brickwork in unusual places, such, for example, as I have indicated in the accompanying sketch which represents a portion of a pier between windows. At the left the brick are started in the correct way for this bond but the lower and every other course comes out a 1 1/2 in. "bat" at the right side, as at "A."

This, it can readily be seen, would be very difficult to hold in the wall to say nothing of cutting such a small piece. How can this be overcome and still have the Flemish bond construction?

Plans of a Wayside Inn

From D. P. Barry, Redford, N. Y.—Quite a while ago a correspondent in Dowagiac, Mich., made inquiry for plans of a Wayside Inn, and having seen nothing in the nature of a reply I am sending drawings which I trust may be of some interest to him as well as to other readers of the paper.

The original design was prepared by me some years ago for execution as a Lakeside Inn at Tupper Lake, N. Y. While the drawings are to scale, the stair openings are only approximate and should be just roomy enough for moving furniture up or down. Under the front stairs a check room could be built, with a small outside window if desired.

The walls are drawn high enough to place the attic floor joist 2 ft. below the plate, thus admitting of a roomy attic. By ceiling the under side of the rafters

The annex at the end of the kitchen should be just high enough to admit the back stairs, which must open out-doors to insure a good fire escape and convenience for chamber work. The kitchen annex may be extended, if desired, far enough to make a wood shed, and a fireplace could be put in where the sitting room chimney starts. In a cold climate, however, a fireplace is a very poor heating apparatus for a zero temperature.

The openings between the parlor and dining room and between the dining room and sitting room should have rolling doors. Red oak will make an all-round good interior finish. The window and door frames should be made with a view to using storm doors and windows in the winter time, as they are great aids to an economical consumption of fuel.

Architects Should Understand Mill Details

From J. W., Victoria, B. C.—Much is said about the architect and the unfortunate contractor who is supposed to know even less than the former, but what about the millman? The drawing given on page 295 of the



Perspective View of a Wayside Inn, as Contributed by D. P. Barry, Redford, N. Y.

good rooms may be had in times of great rush of visitors, and at the same time it will make the attic cooler in summer and warmer in winter. If the attic is utilized a flight of stairs can be built over the front flight. The chimneys should be built of concrete and should rest on the foundation wall. If the building could be erected on sloping ground a portion of the basement would make an ideal garage. The water system and heating are left to the preference of the owner. If the trade of the inn is moderate, water in the bath room, the kitchen and a few nearby bedrooms will be all that is required.

If the family of the owner is to occupy the building permanently a furnace will be the cheapest method of heating.

For the first story $9\frac{1}{2}$ ft. in the clear would seem to be ample and $8\frac{1}{2}$ ft. between floor and ceiling in the second story.

For northern climates the studding should be sheathed inside and out with matched lumber. The general construction may be left to the discretion of the owner and builder in the locality in which the inn may be erected.

June issue shows a box window frame, the extreme width of which between the heavy lines is $8\frac{1}{2}$ in. to which the architect undoubtedly expects the masons to adhere in building the walls. If then the millman contracts each member of that frame to suit his own convenience, thereby reducing the outside dimensions to $8\frac{1}{8}$ in., the frame will be exactly $\frac{3}{8}$ in. too small for the opening.

Does the millman expect the contractor to re-construct those frames, at his own expense as frequently happens, or would he prefer to have them returned upon his hands as bad stock and evidence of the incapacity of a millman to do a sum in simple addition?

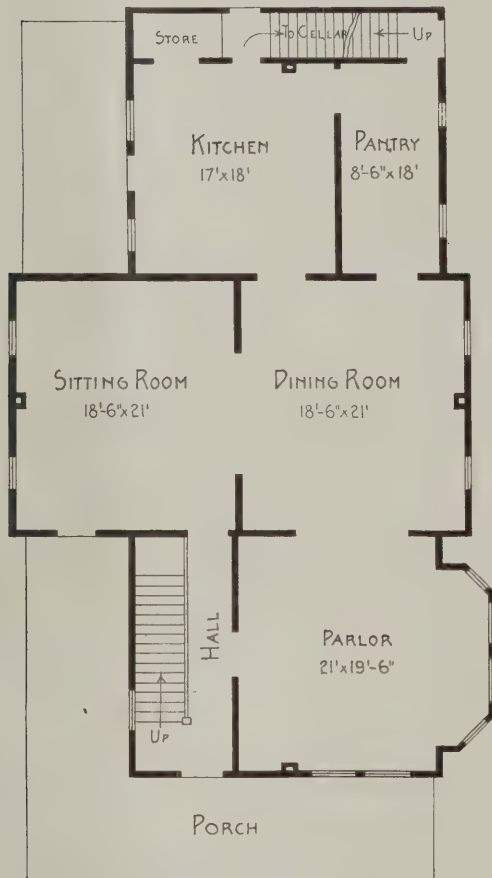
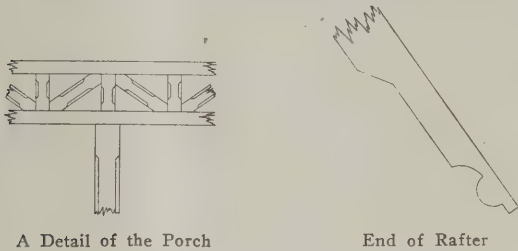
Construction of Concrete Coal Bins

From U. S. E., Boston, Mass.—I intend building of monolithic concrete, a coal bin 62 ft. 8. in. wide, 10 ft. high and 50 ft. long over all. The bin is to be divided into four compartments, each 14 ft. wide, 10 ft. high and 47 ft. 4 in. inside measurement, which makes the wall's and divisions to the bins 16 in. thick, resting on footings 2 ft. wide. The bin is to set into a dirt

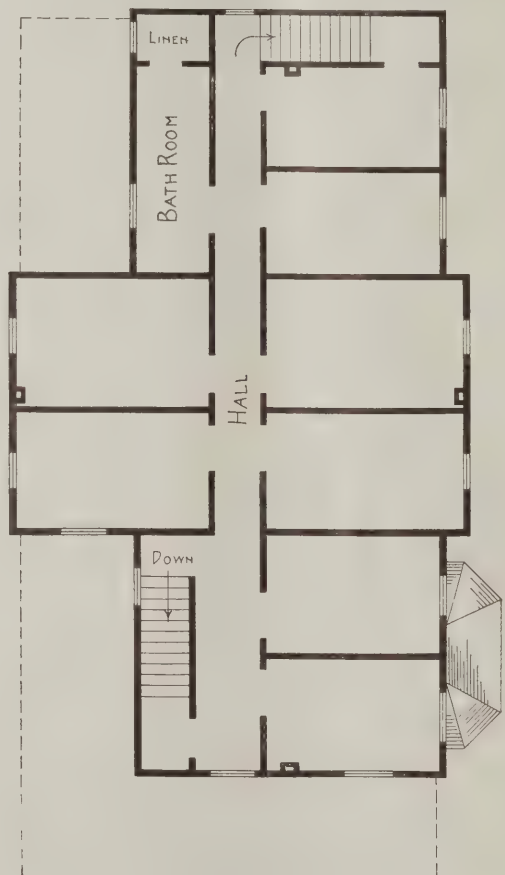
bank on the beach in such a way that the roof will slope 1 ft. in the 50 and the surface of it at one end will be flush with grade, so that the loaded carts can be readily driven upon it from the road.

I want each bin to hold 150 tons of soft coal. I shall put manholes in the roof and the latter must be strong enough in any one place to sustain a cart, two horses and a ton of coal, but at no time will the roof be obliged to support more than 6 tons of weight.

I shall build the walls 16 in. thick of a 1:2½:5 mixture of Portland cement, beach sand and gravel, the latter ranging from ½ in. to 2½ in. in diameter. The mixture is not to be reinforced and the walls will



Main Floor Plan



Second Floor Plan

Plans of a Wayside Inn—Contributed by D. P. Barry, Redford, N. Y.

carry the roof on 10 in. I-beams, placed 5 ft. on centers. I shall lay over them 6 in. of concrete reinforced with ½-in. rods of twisted steel, placed 4 in. on centers.

What I want to know is if I may expect the construction here described to prove strong enough for my purpose?

Remodeling a Story and a Half Building

From F. T., La Grangeville, N. Y.—I have been a reader of *The Building Age* for the last two years, finding it of great value to me, and I now come to the Correspondence columns for information and the advice of some of the practical readers.

I would like to know how to remodel a single story and attic building into a two-story structure, and whether I can use the same corner posts by splicing them for the second story, or whether I shall have to put in new posts and studs extending from sill to plate? I am in doubt as to the safety of increasing the height of the building by splicing the corner posts and how can I use the same roof?

Samples Wanted of Different Kinds of Wood

From E. E. Willard, Huron, S. D.—I am collecting samples of different kinds of wood from all over the world and at the present time have 246 varieties, and would like to communicate with parties who might be able to help me. I will pay cash for small pieces of different kinds of wood, properly named.

Framing a Gambrel Roof Cottage

From A. J. M., Burlington, Ia.—Will some of the practical readers of the paper furnish a sketch showing dimensions for the framing of a gable roof cottage 22

ft. wide, the cottage to be 1½ stories in height, of frame construction with four rooms on the main floor and three bedrooms and bath on the second floor, one bedroom being at the front and one at the back of the house, one in the right side gable and bath room in the left side gable?

The main story is to be 9 ft. in the clear and the attic or second story 8 ft. in the clear. I want a box cornice all over.

What I particularly want to know is the length of the studs and the length and the pitch of the rafters of the gambrel roof; also how the rafters are framed at the several joints?

The cornice is to have a 12-in. frieze and a plancier of beaded ceiling.

A Question in Framing

From W. M. L., New York City.—Referring to the query of "I. F. M.," Los Angeles, Cal., in the March issue of the paper, the meaning I derive from a perusal of it is that the correspondent wants to know how to frame the rafters of a tower, the latter being 30 ft. square in plan and 6 in. rise to the foot run, which makes the pitch equal 24 in. to the foot of run. I am sending four diagrams to show how to find the length and cuts for each timber.

Referring to them, Fig. 1 represents the plan of the four rafters and four hips, while Fig. 2 shows how to find the length of the common rafters, also the foot and top cuts of them.

Referring to Fig. 2, the full length—30 ft.—of the plate is first drawn and then the perpendicular line

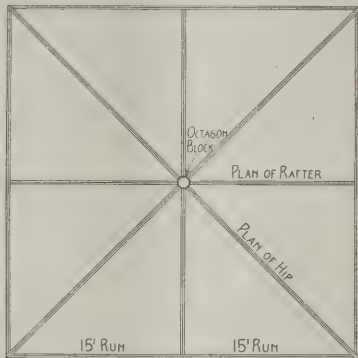


Fig. 1—Plan of Tower

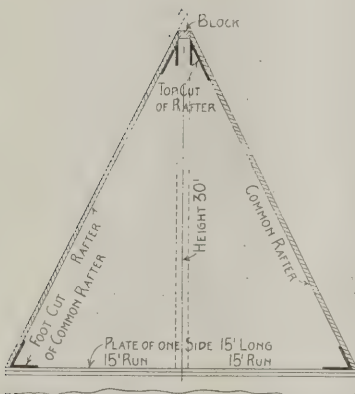


Fig. 2—Showing how to find lengths and cuts of common rafters

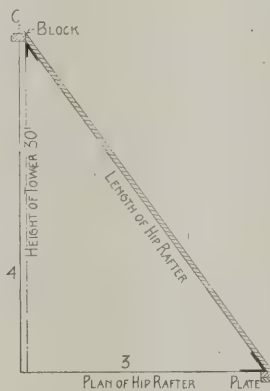


Fig. 3—Showing how to find lengths and cuts of hip rafters

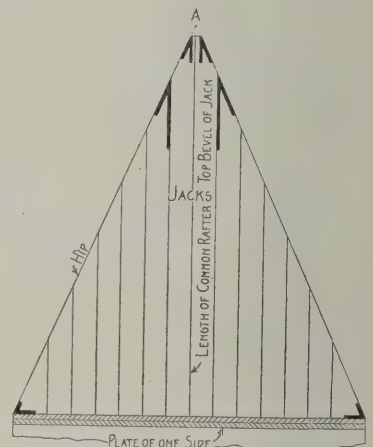


Fig. 4—Showing how to find lengths and cuts of the jack rafters

A Question in Framing—Solution Presented by "W. M. L.," New York City

from its center and also 30 ft. in length is drawn to A as shown. From each end of the plate lines are also drawn to A which determine the lengths of the common rafters.

The bottom and top cuts are shown at the intersections of the rafter lines with the plate and the block at A.

Fig. 3 of the diagrams shows how to find the length and cuts of the hips. Make the bottom line 3 equal in length to the plan line of the hips shown in Fig. 1 and the perpendicular line 4 equal the height, 30 ft., the same as shown in Fig. 2. Draw a line from the plate to the apex C which will represent the exact length of the hips.

The various cuts are clearly indicated in the diagram Fig. 4, which represents the unfolded slope of one side of the tower. The height from the plate to the apex A is made equal to the length of the common rafter.

The jack lines shown in Fig. 4 represent the exact length of each jack, and their intersection with the hips defines the correct back cut of each.

The top and bottom cuts are the same as those of the common rafters shown in Fig. 2.

These four diagrams are presented to a scale of $\frac{1}{16}$ in. to equal 1 ft., but in practice a scale of $\frac{1}{2}$ in. to one foot will be found to produce the best results, as in that case $\frac{1}{8}$ of an inch on the scale will represent 1 in. of actual length and $\frac{1}{2}$ in. on the scale will equal 1 ft. of actual length.

Now to find the lengths and cuts of all the timbers with the steel square proceed as follows:

To find the length and cuts of the common rafters, place a rule upon the steel square extending from the 12 in. mark on the tongue to the 24 in. mark on the blade. The rule will measure the length of the rafter for one foot of run. Multiply this measurement by 15, the total run, and the product will be the full length of the common rafter.

The intersections of the rule with the square will give the top and bottom cuts.

To find the length and cuts of the hips, place the rule upon the steel square extending from the 17 in. mark on the tongue to the 24 in. mark on the blade and again multiply by 15. The product will give the exact total length of the hips and the intersection of the rule with the square will define the top and bottom cuts.

To find the length and cuts of the jacks, I would say that the bottom and top cuts will be the same as those of the common rafter, and the longest jack will also be the same length as the common rafter. If the jacks are to be placed one foot between centers, the difference in the length of each jack will equal the

length of the common rafter for one foot of run, and if the jacks are placed at a distance of 2 ft. from center to center the difference will be twice as much, etc.

To find the back cut of the jacks to fit against the hip, place the square upon the jack timber with 12 on the tongue and the length of the common rafter for a foot of run upon the blade; mark along the blade for the cut.

It will be observed that by using the steel square the problem of framing a tower or a hip roof, which is the same thing, becomes an exceedingly simple operation.

Truing Up an Oil Stone

From G. L. S., Indianapolis, Ind.—I have a "wrinkle" which may be of interest to some of the readers of the paper. If one has an old oil stone which has been carried around these many years and the surface of which has become warped and worn down perhaps $\frac{1}{4}$ of an inch, instead of wearing one's life and patience away trying to grind it down on a piece of sand or emery paper, just take it to an old cement sidewalk

where the smooth troweled down surface has become flaked off by the action of the water, and, turning its face to the walk, grind down in 20 minutes what would require an entire day to do otherwise. If the walk cuts too fast, thus making the stone convex instead of concave, finish upon sandpaper or emery cloth, thus getting a good surface.

A Workmen's Time Check

From A. J. W., Beach, N. D.—I have been a reader and subscriber to your valuable magazine for about a year and greatly appreciate the information which I

[illegible]

A Workmen's Time Check

find in its columns. I am writing at this time for some information, which I trust the practical readers will furnish. I make use of the enclosed time check for each employee, which shows the hours' work for separate jobs. Now, what I want is a satisfactory method of recapitulating the time checks so that the records will show each job separately and the time of each employee for that job. Any method which a subscriber has found to be practical will be greatly appreciated by me and possibly by others as well.

Finding Lengths and Cuts of Valley Rafters with the Steel Square Without Drafting

From Builder, Clinton County, N. Y.—In considering the problem of "W. S. B.," Colorado Springs, Colo., which appeared in the May issue of the paper, I wish

Finding Lengths and Cuts of Valley Rafters with Steel Square Without Drafting

to go beyond his question. It is precisely the same as any other valley rafter problem and is solved in the same way. Referring to the accompanying diagram he must first locate the point *C* which is at the intersection of the line *G-C* and *F-C*. The line *G-C* may be laid off on the attic floor and is the projection of the ridge,

The line $F-C$ is run parallel to the plate and the same distance from it as $G-C$ is from the plate or 9 ft. 5½ in. Set 9-11/24 in. on the blade of the square on A and 6 in. mark of the tongue on C . The heel must be at B . Connect A with C and this will give the projection of the valley rafter. Now take $A-C$ on the blade and the rise of the common rafter on the tongue and the result is the length of the valley rafter.

For the right hand valley place the heel of the square on *D*, the blade on *C* and the tongue on *E*, and this will give the projection of *C-E*.

There is a better and more scientific way of getting the length of all rafters. I have had respect for my steel square but I have more confidence in my pencil and a 10 ft. pole or steel tape line. I have calculated that the ridge is 38 ft., the left plate 32 ft. and the right plate 24 ft.

 $A-B = 9 \text{ ft. } 5\frac{1}{2} \text{ in. and } B-C = 6 \text{ ft.}$

These figures may not be right but it is the proper way to get at it. Call $A-B$ 9.5 ft., which squared gives 90.25. Now 5.5 ft. is near the rise of the ridge $G-C$ and this squared equals 30.25, to which add 90.25 and as a result we have 120.5. The square root of this is 10.97, which is the length of the rafter on the wing. The method of getting the square root is as follows:

	1-20,50	10.97
	<u>1</u>	
20	<u>20</u>	
	00	
200	<u>2050</u>	
9	1881	
<u>2180</u>	<u>16900</u>	
7	15309	

This result is correct to less than 1/100 of an inch. Now $120.50 + B-C$ squared gives 156.50, the square root of which is 12.5 ft., the length of the valley rafter.

How many mechanics own a copy of Barlow's Tables? To perform these operations with Barlow's Tables we have only to write $9.5=95$ and $5.5=55$ and cut off from the result two figures from the right hand. The squares of the numbers are in the tables; the square root of 120 is in the tables, also the square root of 156. The tables give the squares, cubes and square root and cube root and reciprocal of every number from 1 to 10,000 in a small volume.

The square root method gives results in life size. Any ordinary arithmetic gives methods for obtaining square root. Then if you do not understand the process go to some teacher who will be able to help you, and at the same time feel flattered that you think they know so much.

Washing Crushed Stone for Concrete Work

From E. G. H., Atchison, Kansas.—Have any of the readers of the paper a quick, easy and economical method of washing dirty crushed stone intended to be used in connection with concrete work and without the necessity of employing a concrete mixer for the purpose. I have tried the latter method but have found the use of a mixer for the purpose slow and expensive.

Designs Wanted of Cottages of the Bungalow Style

From J. P. O., Milwaukee, Wis.—Will some of the readers furnish a few "Bungalow Style" cottages with two bedrooms on the second floor for erection on city lots 40 ft. front. The cottages should have vestibule for cold climate and the designs should be such that they will not look too flat or "squatly" among two and three story dwellings. The cost should range between \$3,000 and \$4,000.

Six Months' Building in New York City

The reports of building operations in the five boroughs constituting Greater New York and covering the first six months of the current year indicate a heavy shrinkage in the estimated cost of new construction work for which permits were issued, as contrasted with the corresponding period of last year. In the Borough of Manhattan this falling off is very marked and is undoubtedly due in part at least to the more conservative loaning of capital for new operations—a condition which has been much discussed for some little time past by real estate operators as well as by architects and builders. The semi-annual statistical report of R. P. Miller, Superintendent of the Bureau of Buildings of Manhattan, shows that plans were filed this year for 372 new buildings costing \$36,053,135, as against 469 buildings costing \$67,182,400 for the first six months of 1912. One of the most striking items is that of office buildings, of which eight were planned the first half of this year, estimated to cost \$2,358,000, while in the same period last year permits were issued for 25, to cost \$10,408,000. There were 55 store and loft buildings planned to cost \$10,606,000, as against 100, costing \$25,051,700 in the first half of last year; 7 hotels, costing \$1,075,000, as against 7, costing \$6,060,000 last year; 94 tenements, costing \$10,140,200, as against 93, costing \$11,709,000 the first half of last year. There were 12 factories planned this year, costing \$2,937,000, as against 32, costing \$4,440,100 last year; 5 schoolhouses, costing \$620,000, as against 14, costing \$1,240,000 last year; 63 places of amusement, costing \$3,940,375, as against 59, costing \$5,106,600 last year; 24 dwellings, to cost \$2,100,000, as against 18, costing \$1,037,500 in the same period a year ago; 4 hospitals, costing \$780,000, as against none last year; and 22 stables and garages, costing \$616,000, as against 24, costing \$512,000 in the first half of 1912.

The report shows plans filed for repairs and alterations involving an outlay of \$6,887,938, as compared with \$6,234,297 in the first half of last year.

The figures for the Bronx show the new construction work for which plans were filed to have been estimated to cost \$15,371,756, while in the same period of 1912 the figures were \$20,152,285.

During the first six months of this year plans were filed in Brooklyn covering 1,933 buildings, involving an estimated outlay of \$16,538,551, while in the same period of last year plans were filed for 2,795 buildings, to cost \$20,182,087.

Taking the figures for the three principal boroughs of Greater New York it will be seen the estimated cost of the new construction work for the first half of the current year was far below the figures for the corresponding months of last year.

San Francisco's New Building Ordinance

The supervisors of the City of San Francisco have passed an amendment to the building ordinance allowing wooden buildings to be erected to a height of 40 ft. measured from the curb line in front of such structures, thus making possible additional basement room in lots that slope down from the street.

Director E. R. Zion, of the Municipal Bureau of Efficiency, has filed a report with the Supervisors recommending that buildings at street crossings be constructed with rounded corners, pointing out that the increased speed of vehicles makes it highly desirable that drivers approaching corners should be able to see for some distance on cross streets.

The Chamber of Commerce is urging that the city require building permits to be taken out for public buildings without charge. In a letter the Chamber states that the poor showing recently made by San

Francisco building records is due to the fact that the city does not require building permits for any structures erected by the Municipal, State or Federal governments. It is said that in the city during the past three years contracts for public buildings alone amounted to over \$7,000,000, but this amount does not appear in the official records.

Bulk Heads in the Equitable Building

Following the suggestion of Fire Commissioner Johnson of New York City, it is stated that the new Equitable Building in lower Broadway will be divided into four separate compartments, thus affording a system of fire protection more elaborate than anything yet introduced in our building construction.

The plan calls for a double fireproof wall extending from the sub-basement to the top or the thirty-sixth floor, these walls intersecting at right angles in the center of the building.

A Dwelling House of Unusual Construction

A dwelling house involving some rather unique features of construction is under way on the ranch of A. K. Macomber, near Hollister, Cal. The house is in the Moorish style of architecture and a feature will be a patio in the center with a concrete swimming pool, 52 x 72 ft. in size. The house covers a ground area of 124 x 116 ft. and 18 of the rooms will be finished in white cedar and birch. One of the most striking features of this residence, which will be of frame with stucco finish, will be an arch roof of Roman bronze screening supported by five steel girders.

Heating Dwellings by Electricity

The city of Seattle has recently made provision for heating dwelling houses by installing electric heating coils under the hot-water boilers and individual radiators in the houses of those who order the service. The heaters are automatically controlled by a device which cuts off the current when the heat reaches the desired degree and turns it on again when the temperature falls below a certain degree. It is said that these heaters provide a satisfactory amount of heat at a less cost than coal.

The encroachment of commercial structures in the Fifth Avenue section of the city is well illustrated by the plans which have just been filed for the erection of three 20-story loft buildings on the east side of the avenue between 30th and 31st streets, New York City. One building will have a frontage of 99 ft. and a depth of 164½ ft.; the second will cover an area 99 x 130 ft., and the third, 70 x 79 ft. The façades will be of brick with limestone and terra cotta trimmings. The cost of the first-named structure is placed at \$975,000; the second at \$825,000 and the third at \$450,000. The plans were prepared by Schwartz & Gross, 347 Fifth Avenue, New York City.

A correspondent of the *Record and Guide* desires to know who will put money into real estate mortgages when the City of New York sells bonds at an average price which will yield interest at 4.49 per cent. The reply made to the question was that "if mortgage money hadn't been so plentiful in the last few years there would be fewer complaints now of overbuilding."

The legality of the architect's license law of Illinois has been upheld by a decision of the Supreme Court.

A FOUR-ROOM COTTAGE WITH SCREENED PORCH

Plan and Elevations of an Inexpensive House in Which Are Included Features Often Lacking in More Costly Structures—Figures of Cost

COST has undoubtedly much to do with the making of a house of attractive design, but architects are now beginning to realize that it is possible to construct an inexpensive dwelling on artistic lines, and that the fact that a house is inexpensive is no reason why it should be repulsive in aspect. The four-room cottage discussed in the present article is a case in point. The columns supporting the front porch, the brick chimney, and the two pairs of large windows in the

The corner posts are 4 x 6 in.; the floor joists 2 x 8 in.; sills, 3 x 6 in.; girders, 6 x 8 in.; studding 2 x 4 in.; rafters, 2 x 6 in., and plates 4 x 4 in.

The rooms have a single floor of 2½ in. comb-grained flooring. The trim is of cypress treated with a light mission shade of Johnson's stain, and then with a coat of Johnson's flat finish, as made by S. C. Johnson & Son, Racine, Wisconsin. It is rubbed down by hand.

The doors are of cypress with five cross panels and are 1⅝ in. thick. The windows are fitted with double hung sash, 1¼ in. thick.

The beams of the second floor are dressed yellow pine and are left exposed. All walls are finished in panels of "Compo-Board," made by the Northwestern Compo-Board Co., Minneapolis, Minn. A Fred. Adeo sink is provided in the kitchen.

The contract price of the cottage was \$1,250, but this did not include heating plant or stove. The following are some of the more important costs:

Excavating	\$14.00
Masonry	210.00
Painting	140.00
Plumbing	45.00
Lumber	560.00
Hardware	40.00

Total\$1,009.00



A Four-Room Cottage with a Screen Porch—View Showing Front, and Left Side with Chimney—C. C. Petersen, Builder, Tottenville, New York

front of the house are features calculated to attract the attention of the interested builder and home seeker. The economical and convenient utilization of space in the arrangement of the rooms is apparent from a glance at the floor plan. The builder states that two objects were kept in view in the design of this dwelling: First, to get as much space as possible for \$1,250; and second, to use that space to the best advantage.

A clinker-brick fireplace adds to the comfort and attractive appearance of the living room, and this effect is still further increased by two ample window seats, one beneath the double window at the right of the fireplace, the other at the left of the fireplace and extending beneath the mullion window at the side and the two large windows at the front. All rooms open from the living room.

Each of the bedrooms is provided with a closet and the kitchen has a dish closet. The screened porch at the rear of the house can be used either as a porch or dining room, as may be preferred, and can be enclosed with glass in cold weather and used as a conservatory—a feature seldom found in a house of this size.

There is no cellar under the cottage. It rests on a stone foundation wall 8 in. thick, which in turn is supported on a concrete footing placed 18 in. below grade.

The exterior walls are covered with red cedar siding turned rough side to the weather and stained two coats. The roof is covered with 18-in. red cedar shingles, laid 5¼ in. to the weather. The partition studs are set the 2-in. way to save space. All framing is of spruce.

This four-room cottage was erected for Miss Gertrude Butler, at Tottenville, Staten Island, N. Y., by Christian O. Petersen, builder, 222 Wood Avenue, Totten-



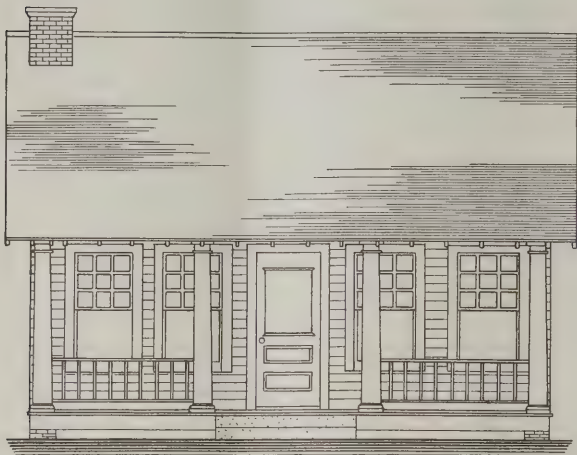
Plan of First Floor—Scale 1/16 In. to the Foot

ville, N. Y., from plans prepared by Charles B. Keffer, in charge of the architectural department of the builder.

Beginning July 1 the union carpenters of Fort Worth, Texas, received an increase of 5 cents per hour in wages and a half holiday on Saturday.

A Glass Building Twelve Stories High

Something of a decided novelty in the way of a commercial building has just been commenced at the corner of Tenth avenue and 36th street, New York City. The architects, Goldwin, Starrett & Van Vleck, have provided the plans for a 12-story skyscraper in which the entire front of the building and its interior sides are to be entirely of glass. In fact, 78 per cent. of the walls will be of this material. There will be no open-



A Four-Room Cottage with a Screen Porch—Front Elevation—Scale $\frac{1}{8}$ In. to the Foot

ings in the glass façade except those in the front of the building for emergency purposes, but which will not be visible from the street.

Ventilation will be accomplished through a specially devised system of ducts through which will be forced cooled and washed air and let into the offices at whatever temperature the tenants may desire. Humidity will be an unknown quantity, as it will all be washed out of the air, which will be cool, dry and free of all dust. In the winter season this same system will furnish heated air.

Vibration usually noted in buildings where heavy machinery is operated has practically been eliminated and anti-noise has also received attention in other directions. All floors are to be rubber-tiled.

It is estimated that the structure will cost approximately \$600,000, of which amount \$78,000 will cover the cost of the glass. On the interior the glass will be a specially polished plate and for the exterior surface will be a specially treated plate that will not transmit heat waves into the interior.

In the basement will be a power plant which will be one of the most complete of its kind in the world. There will be express and local elevators of the plunger type and special elevators for various floors. The structure will be known as the Hill Engineering Building and the first four floors will be occupied by the Hill Publishing Company. In its quarters there will be electric machines for opening and sealing mail matter, dictaphones and noiseless typewriters. Another feature of this section of the building will be a contrivance for carrying "copy" between two floors, which is said to do the work of 22 "copy" boys. The mail chutes will be sufficiently large to mail whole sacks of matter instead of one or two letters, which is the average capacity.

The Conservation of Human Activities

Every time a workman is injured and has to leave his employment for a shorter or longer period the productive capacity of the plant is decreased. If his place be at once taken by another man there is still the loss of productive capacity to the community, and usually the loss to the plant will not be compensated by putting a new man on the job, because he frequently lacks the experience and ability of the regular man. This makes all the more pointed the recent remark of Norman F. Hesseltine, manager of the Contractors' Mutual Liability Insurance Company, Boston, Mass., to the effect that the true purpose back of all compensation laws is not so much the adjustment of monetary compensation as it is the prevention of accidents and disablement. This is conservation in its truest form and is an object worthy of the most careful and painstaking study.

No amount of financial compensation can bring back the finger or foot which has been taken off by an accident. Every such accident impoverishes the community to that extent, and any succession of them is liable to become a very serious matter economically, both for the establishment in which the accidents occur, and for the industry and community affected. When an athletic team has several of its members on the sick list because of injuries we hear a great deal about it. The matter is of much less economic importance, however, than the same amount of injury to men engaged in productive activity.

Heating by Pipe Embedded in Concrete

A novel heating system was recently installed in one of the buildings of an automobile factory at Moline, Ill., where, owing to the fact that mechanics were usually obliged in their work to lie upon the floor for some time, it was especially desired to heat the floor. The method adopted was by means of steam pipes embedded in the concrete floor. The factory is 60 ft. wide by 120 ft. long with door openings at the ends of the building. One and a quarter inch steam pipes spaced 42 in. on center were laid at a point 2 in. below the surface of the 6-in floor slabs. These pipes were



Side Elevation—Scale $\frac{1}{8}$ In. to the Foot

inclosed in corrugated galvanized iron pipes. Eight inches of cinder fill was placed below the floor slabs as an insulating material. In addition to the above equipment five small metal radiators are installed, and it is said a uniform temperature between 60 and 70 deg. F. can be maintained under average winter conditions.

Present indications favor a very quiet summer in the lumber business in and about Greater New York.

STANDARD METHODS IN FIREPROOFING PRACTICE

Disirability of Standard Practice in Fireproofing Applicable in Any Section of the Country for a Given Type of Structure

IF it has been desirable and necessary to establish standard specifications in the manufacture of steel members used in building construction, and to formulate a definite method of making connections between such members to enable each to perform its static function as contemplated in the structural design—why, then, should it not be equally desirable and important to arrive at the most satisfactory method of preserving intact such structural work, so as to make it as proof against the influences of disastrous conflagrations as it is efficient in resisting stress? asks H. W. Frohne in *Building Progress*. The obvious affirmative answer must be qualified by the assertion that here is an important question, which, though it has been the subject of considerable periodic discussion, has not been solved to keep pace with the demands of safe building construction.

Conditions Imposed by Building Codes

Certain general precautions, lessons learned during the early days of attempts to build fire-resisting structures, are prescribed by the building codes of the larger cities, all more or less modeled on those of New York and Chicago, but the subject has not been made the occasion for the far-reaching investigation it merits in the light of past experience and the needs of current practice.

There is no reason why it should not be entirely feasible to take up the question of fireproofing and establish a standard practice applicable in any section of the country for a given type of structure; the destructive effects of fire are fairly well understood and do not appreciably vary for slight modifications of external conditions and for variations in plan disposition in buildings of a given class.

These would be among the chief considerations to be taken into account in safeguarding incombustible construction against destruction by fire. Tests are frequently made in the interests of patented materials and systems possessing certain commercial advantages, but the tragically real tests of recent conflagrations prove unmistakably that little substantial progress in the art of fireproofing has been made in the past two decades, unless we except the use of hollow terra-cotta tile for structural purposes. In this system there is, of course, no concealed construction damageable by fire, and the problem of fireproofing is solved by dispensing with the necessity for protecting underlying structure. But, as far as can at present be foreseen, steel-skeleton construction has come to stay, and the present generation of builders cannot hope to escape the responsibilities arising from the constantly increasing seriousness of the fireproofing problems it involves.

Tests of Building Materials

It is a curious condition, and one no doubt traceable to lack of precise definition of an architect's function, that as a general rule investigations involving the testing of building materials for strength or fire-resisting qualities are regarded as of interest solely to the engineering specialist, whereas, as a matter of fact, an overwhelming majority of the specifications calling for the applications of such materials are prepared in the *architect's offices* by *architects* and not by engineers who have specialized on the subject of materials and the art of fire protection.

In the larger architectural offices there are, to be

sure, specification men who, in some cases, possess special engineering training, but who oftener have been trained, by those before them, to believe that questions of materials, involving such important matters as fireproofing, are unalterably answered by the practice of certain patented systems. They, therefore, take it for granted that the manufacturer produces a material of the most suitable composition and design and that the contractor who installs it knows all there is to be known about the best methods of applying so that it will most efficiently perform its work at the critical time, and that, therefore, the best course to be pursued is to follow the information supplied through ordinary commercial channels and not delve further into the subject.

Architects Cannot Refuse Responsibility

It does not occur to architects with its full force that they cannot continue indefinitely to refuse to assume responsibility for much of the technical information of this character called for in up-to-date practice. There is no intention, in any way, to imply that an architect's duties are not already sufficiently exacting or that the information which is obtained through present channels on the use of fireproofing materials is not the best to be had under the circumstances, but it is maintained that the conditions which produce the information are not the most favorable for efficiency and progress. Also, that the results thus obtained obviously take too little account of the architect's point of view.

That architects should, as a class, be content to assume the moral responsibility for the outcome of so important an item in building as fireproofing, without taking a more active part in formulating advanced methods of effecting safety, it is difficult to explain. The future of the profession in this country is at stake, as well as the interests of those who invest their money in buildings.

The architectural profession could present no stronger argument against the notion still, to some extent, popularly credited that architects merely make drawings, and that builders really do the important work of building direction, than by vigorously advocating a wider professional interest in and greater knowledge of fireproofing. Such a step would not only be looked upon with favor by manufacturers of building materials and building contractors alike, but would receive their heartiest active cooperation. These mutually dependent interests are only too anxious to unite their special knowledge of the subject with that of the architects, both in order to arrive at the broadest results and most efficiently to serve their respective interests.

At present all three parties are, in a way, handicapped for the lack of a standard practice in fireproofing. For example, the architect sees the merits of a more permanent architecture and the opportunities it offers him for artistic expression. He is, therefore, desirous to encourage its universal adoption. The manufacturer of fireproofing materials sees opportunities for expanding the market for his product and does everything in his power to assist the architect's campaign for fireproof construction. Finally, the contractor comes along, and, though anxious enough to share in the benefits of such a movement, finds himself between the architect's specifications, which are either not enough to fully insure the safety of his proposals,

lacks the acquaintance to enable him to bid closely.

The result is that when jobs are given out for figures the contractor bids high enough to secure himself and the manufacturer's instructions, with which he against supposed contingencies, and by so doing very often places fireproof construction beyond consideration. The owner, rightly, sees no reason why he should have to pay so much more for the advantages of the additional protection than the manufacturer assures him is a fair price.

The remedy can come only through the cooperation of the contractor with both architect and manufacturer, looking toward the establishment of a standard practice which shall take into consideration all sides of the question of fireproofing. Only by a course of this kind can the full advantages of the use of fireproofing materials in building construction be realized and their value brought to the fullest attention of the layman.

A commission, composed of representatives of these interests, with the very valuable cooperation of the experts of the National Board of Fire Underwriters and their extensive observations of the behavior, in conflagrations, of fireproofing materials, cannot fail to evolve standards of real significance, equally fair to all concerned.

Restricting the Hights of Buildings

Apropos of the discussion which has been going on for some time past with regard to limiting the hights of buildings in New York City, Robert Grier Cooke, president of the Fifth Avenue Association, which has gathered much data on the subject and placed it before the newly created commission to inquire into the practicability of limiting the hight of buildings in the city, expresses some views which may not be without interest. After commenting upon the hight to which buildings are permitted in many of the leading cities of this country he refers to conditions in some of the foreign cities as follows:

"As America is the home of the skyscraper the limits to building hights here are placed far higher than in the great cities of Europe. Berlin permits a maximum hight of 72 feet, but no building can rise higher than the width of the street. The maximum hight allowable in Cologne and in Düsseldorf, known as the park city of Europe, is 65 feet 6 inches. Munich draws the line at a building having a ground floor and four stories, not counting a mansard.

"Frankfort, Germany, is divided into zones, the maximum hight for buildings varying from 58 feet 11½ inches to 65 feet 6 inches in the inner city. In Zurich a maximum hight has been fixed at 43 feet.

"In London, according to the building act of 1894, in a street under 50 feet wide all buildings are limited in hight to the width of the street. In streets more than 50 feet wide no building can be put up which rises more than 80 feet into the air. In Birmingham, England, the hight of building is regulated in accordance with a proviso that a line drawn upward at an angle of 45 degrees from the edge of the premises will meet no resistance.

"Paris does not permit a façade higher than 65½ feet, while in Rome the hight limit is set at 78½ feet, with a minimum high required of 45½ feet.

"Taking into consideration all these limitations which have been thrown around new building construction in these world cities doesn't it seem as if the time had arrived in New York for making it impossible in the future to erect ultra high buildings in districts where such structures are obviously not wanted and not necessary? The Fifth avenue section is such a district. The many towering loft structures erected

in the street and close to it in the last ten years or so, with their countless factories and swarms of workers that inundate the avenue's pavements and blight its legitimate business, have already worked immense damage to the shopping district and its interests. Unless the present tendency to line the avenue with skyscrapers of this class is speedily checked Fifth avenue will soon be a cheerless, sunless canyon with none of its historic charm and filled with a struggling mass of humanity having nothing in common with the street's present purposes. Why not follow the wise example set by numerous other American and European cities in holding buildings within reasonable limits as to hight?"

Removing Broken Screws

In order to get out broken screws, bolts and short studs, which were not long enough to be gripped with pinchers, gas pliers or jam-nuts, G. H. Ander, who tells about it in the *Scientific American*, has successfully used a nut (employing various sizes for various screws) cut through from one side with a hacksaw to form a split nut. The split nut was screwed on the screw as far as possible, then it was gripped in a pair of pinchers or gas pliers in cases of light work, or in a clamp or hand vise for heavier work. The nut in turn gripped the screw so that it was easily unscrewed.

Such a nut may also be used to hold short round or flat-headed screws or set-screws while they are cut to desirable lengths with hacksaw or file, which operation is very bothersome, especially if the screw is so short that the part that is to be taken off does not let the wire get a good grip on it.

The Largest Stone Ever Quarried

What is said to be the largest stone ever quarried is a great monolith in the ruins of Baalbec in Syria. It is 69 ft. long, 14 ft. broad, and 17 ft. deep, and is estimated to weigh 1,500 tons. It is thought by archaeological scholars that this huge stone was intended by the ancient builders to adorn the Temple of the Sun near by—now, of course, in ruins.

Here, in one of the walls, which still stand, are to be seen huge slabs of stone, which careful measurements show to be 63 ft. long and 13 ft. high. And, more remarkable still, they are placed in position 19 ft. above the ground level. Moreover, although no sign of any cementing mixture is to be found in these ancient buildings, the stones have been squared and polished so evenly that only after the most minute search can the joints be found, and when traced it is impossible to thrust the blade of a pocket-knife between them.

The question of moving the offices of the Bureau of Buildings for the Borough of Manhattan further up town, where they will be nearer the geographical center for architects who have offices in this borough, is being agitated and the suggestion has been made that an excellent location would be the Builders' Exchange building, 29 West Thirty-second Street, between Fifth Avenue and Broadway.

The skyscraper known as the "Professional Building," and recently referred to in these columns as being erected at Seventy-second Street and West End Avenue, New York City, will rise 465 ft. above the street level, which will make it rank sixth in the list of New York's tall buildings.

CONCRETE FLOORS FOR POULTRY AND HOG HOUSES

Planning the Sanitary Floor and Laying the Concrete—Proportions of the Mixtures
Used in the Work—Relative Economy of the Floors

IN the erection of buildings intended to house poultry, sheep or swine the question of sanitation is a most important one and it is generally recognized that in the case of such structures concrete serves as a most satisfactory floor material. When properly constructed concrete floors have no cracks in which vermin can breed and they are likewise proof against the attack of rats and other destructive animals. Another advantage is that concrete floors do not harbor disease germs and can be easily cleaned and disinfected. In the country sections this form of floor is growing in popularity by reason of its sanitary qualities and economy of cost, for, in the long run, it requires few if any repairs.

In the accompanying illustration we show the interior of a rather commodious hog house with concrete floor and with "wallow" at the end.

The first step in building a floor of this kind is to remove all foreign matter and then grade the surface of the ground. In case of necessity all water pipes and drains required for keeping the ground dry and for carrying off waste water should be laid. Such earth filling as may be necessary should be dampened and thoroughly tamped as long as possible before laying the floor. The concrete should be kept from direct contact with the earth by covering the entire surface of the leveled-off ground with 6 to 8 in. of coarse crushed rock or screened gravel.

A satisfactory method of grading the surface of the floor is to use a carpenter's spirit level or a water level and a chalk line. A 4 in. thickness of concrete is sufficient and the floor should be sloped $\frac{1}{8}$ in. per foot in such direction that the rain or scrub water will cause the least inconvenience. In the case of poultry houses this will usually be toward the door, while for sheep sheds and hog houses it will be away from the animal's bed and in the direction of the gutters. According to the Association of American Portland Cement Manufacturers, to whom we are indebted for the accompanying illustration and particulars, the usual proportions of concrete for such floors are 1 cubic foot of Portland cement, $2\frac{1}{2}$ cubic feet of sand and 5 cubic feet of crushed rock or screened gravel, or 1 part of cement and 5 parts of bank-run gravel. These materials are measured on the basis that 1 bag of cement (loose) equals 1 cubic foot. Mix them thoroughly on a tight wooden platform (never on the ground) and use enough water to make the concrete "quaky."

Lay the floor in a manner similar to sidewalk construction. If the sand and rock are first-class in

quality, no finishing mortar is required. Such a mortar is generally mixed 1 part cement to 2 parts sand and is applied (1 inch in thickness) to the 3-inch concrete base before the latter has begun to set.

To provide good footing for animals, the floor should be finished merely with a wooden float. A steel-trowel finish is entirely too smooth and, if made, should be roughened with a stable broom. Should removable wooden or gas-pipe pen-divisions be used, make mortises for them in the floor at the proper points by inserting short lengths of gas pipe or drain tile, or by tamping the concrete around tapering greased wooden cores, which must be withdrawn as soon as the concrete has stiffened.

With the proportions given above, 4 bags of cement (1 barrel), $\frac{3}{8}$ cubic yard of sand and $\frac{3}{4}$ cubic yard of crushed rock will lay a section of floor 8 feet square by 4 inches thick. The cost for the materials alone

will be about \$2.50. As to the labor, ordinary farm help can do the work very well.

Regardless of the material used for the floor, a certain amount of covering must be provided for floors of houses for poultry, sheep and hogs. Floors of poultry houses should be covered with a layer of sand or litter. The floor of the sleeping quarters of a hog house should be provided with a removable slatted wooden platform,

which must be well supplied with bedding of straw or litter.

Concrete floors are the cheapest as they seldom have to be repaired or replaced. Moreover, they can be flushed out with a hose or thoroughly disinfected with oil or other substances without injury to the concrete.



Concrete Hog-House with "Wallow" at the Farther End

Officers of Building Managers and Owners Association

At the recent convention of Building Managers and Owners in Cincinnati, J. E. Randell of Chicago was elected president; Charles E. Doty of Cleveland, vice-president; C. A. Patterson of Chicago, secretary, and L. L. Banks of Pittsburgh, treasurer.

An exhibition of building materials and equipment was held in connection with the convention. A lively contest developed in order to secure the 1914 convention, but the result was a victory for Duluth, Minn.

Building operations in New York City in 1912 required 1,019,250,000 bricks valued at \$5,858,770, as against 926,072,000 bricks in 1911 valued at \$4,717,633.

New Publications

Hicks' Builders' Guide—By I. P. Hicks; 164 pages. Size 5 x 7 in. Illustrated with 114 diagrams. Bound in stiff covers. Published by David Williams Company, 239 West 39th Street, New York City. Price \$1.00.

The popularity of this well-known work, the bulk of which originally appeared in the columns of *The Building Age*, may be gathered from the statement that the present is the twenty-second edition, revised and enlarged. It is a comprehensive guide to those practically engaged in the various branches of the building trades and constitutes an easy, practical system of estimating material and labor for contractors, builders and carpenters.

In the present edition new matter has been added and some revision has been made in order to maintain the work on a thoroughly up-to-date basis. The information is presented in concise form and the object of the author has been to point out how mistakes may be avoided in making estimates and to introduce a special system for making such estimates, thus enabling the carpenter or the builder to do the work with greater accuracy.

In the arrangement of the matter attention is first given to some general comments on the subject of estimating, then follows a list of items for estimating lumber, after which the measurement of roofs is considered. Another chapter deals with hip and valley roofs, another with estimating labor for carpentry, while still other features considered are short cuts in estimating, methods of construction, the art of roof framing, mitering moldings, planciers, etc.

Not the least interesting feature of the work is a selected list of useful books for the carpenter and the builder who is desirous of keeping abreast of the times.

Modern Farm Buildings—By Alfred Hopkins; 206 pages. Size 7½ x 10½ in. Numerous illustrations. Bound in board covers. Published by McBride, Nast & Co. Price \$3.00 net.

The increasing tendency toward sanitary farm buildings, and especially the barns, whether dairy or otherwise, renders more than ordinarily interesting the work under review. The bulk of the matter is devoted to the cow barn, in the construction of which special attention is given to the location and arrangement of the cattle, the stalls and pens, watering and feeding troughs, floors and floor drainage, plumbing, ventilation, artificial heat, silos, cow yard, painting, blinds, doors, windows, etc. Much attention is also given to the feed room and the milk room, as well as to the materials and sizes thereof to be used.

One chapter is devoted to the dairy and its equipment, another to milking machines and vacuum cleaner, while still another chapter has to do with other buildings of the farm group, such as the hay barn, the farm stables, wagon and harness rooms, horse stable with stalls and feed room, sheds, machinery and tool rooms, hardware, etc. The sixth chapter is devoted to plans of farm barns, these having been selected from many buildings erected during a period of 10 or 12 years, mostly in New York State, and within a comparatively short radius of New York City.

The independent garage forms the basis of an interesting chapter and the work concludes with a consideration of various other buildings on the farm such as chicken houses, sheep fold, piggery, root cellar, ice house, corn crib, etc.

The value of a work of this character may be judged in part at least by the statement that the author is known throughout this country and abroad as an architect who has specialized in farm buildings of all kinds

and in his many years of active practice he has developed a knowledge of methods, materials and design that command instant attention. Every phase of modern scientific stable building has been covered and the entire subject is made clear with a profusion of plans and half tone engravings of buildings already erected. The work therefore cannot fail to prove a valuable addition to the library of the architect and the builder, especially to those designing and executing work in the suburban and rural districts of the country.

Estimating Frame and Brick Houses, Barns, Stables, Factories and Outbuildings—By Fred. T. Hodgson; 252 pages. Size 5 x 7 in. Numerous illustrations. Bound in stiff board covers. Published by David Williams Company, 239 West 39th Street, New York City. Price \$1.00.

This is the ninth edition, revised and enlarged, of a work well known to the readers of this journal by reason of the fact that much of the matter originally appeared in the shape of a series of articles in the columns of *The Building Age*. It is of a size very convenient for reference and this is greatly facilitated by a comprehensive index alphabetically arranged. It is a generally recognized fact among the trade that much of the success or failure in connection with a contract depends upon the accuracy with which the builder securing the job has made his estimate. It is not infrequently the case that several items of more or less importance will be overlooked when preparing his figures, and it is to insure against such oversights that the work under review was brought out. "Order in Estimating" is one of the first things to which the attention of the reader is drawn. Careful observance of the suggestions set forth in this chapter cannot fail to prove advantageous to the contractor when preparing his bids.

In the arrangement of the matter more than half of the book is taken up with a consideration of "Frame Construction" and the various phases of a building of this character. This is followed by "Suggestions in Estimating Brickwork," after which come "Estimating the Cost of a Stable," "Estimating a Barn," "Details in Estimating," and a form of contract, as well as a form of tender.

Modern Homes of California—Size 10½ x 7¼ in.; 96 pages. Profusely illustrated. Bound in paper covers with handsome design in colors. Published by the Los Angeles Investment Company. Supplied by *The Building Age* Book Department, 239 West 39th Street, New York City. Price 50 cents.

As indicated by the title the matter contained within the covers of this little work consists of a series of designs of bungalows planned and erected by the concern in question. The illustrations are well executed half tone engravings and represent for the most part exterior views with here and there some accompanied by pictures of the interior. Plans are given, together with a brief outline of construction. In view of the rapidly growing popularity of that cozy-cottage-type-of-architecture commonly designated as the "bungalow" this little work, issued in what is known as "the heart of Bungalow Land," cannot fail to command a great deal of attention on the part of those contemplating a home of the character indicated.

A paper on the "Decorative Possibilities of Concrete" was presented at a recent meeting of the Western Society of Engineers, Chicago, by J. H. Libbertoni, assistant engineer of the Universal Portland Cement Company. The address was illustrated by 125 specially colored stereopticon slides which had been collected from all parts of the country.

CURRENT NEWS OF THE BUILDERS' EXCHANGES

How Members of Some of the Organizations Have Been Enjoying Themselves—Ohio Lien Law—Election of Officers

"Outing" of Cleveland Builders' Exchange

BLUE prints and figuring rules were forgotten by members of the Builders' Exchange of Cleveland for several days the last week of June while the fifteenth annual outing of the exchange was in progress. A party of nearly two hundred left Cleveland on the night of June 19 on board the palatial new steamer "Seeandbee," the largest passenger boat on fresh water, which now plies between Cleveland and Buffalo. Arriving in Buffalo, a special train was taken for Niagara-on-the-Lake, Canada, where headquarters were established at the Queen's Royal Hotel, the full capacity of the resort being reserved for the builders.

A program, including side trips to Toronto and other points of interest, athletic sports and ball games, dancing in the hotel casino, fishing, boating and bathing, kept the party busy until Thursday afternoon, when the return was made to Niagara Falls for a sight-seeing visit. Dinner was taken at the International Hotel, after which the party boarded a special train for Buffalo, making the journey back to Cleveland on the same boat as the going trip. It may be interesting to state that the ball game was between the Blues, or material men, led by A. C. Klumph, and the Whites, or contractors, of whom George R. Rutherford was captain. The material men were victorious in a hard-fought game, the score being 10 to 9.

Oakland, Cal., Builders' Exchange Day

The inauguration of one of the best means ever devised for bringing together the various building crafts of Alameda county, Cal., was witnessed Saturday, June 14, when occurred the Builders' Exchange day, which was pronounced a great success. The event started with an industrial parade, over two miles long, in which all the prominent material firms participated, E. G. Hunt being marshal.

Prizes were awarded for the best industrial exhibit, best decorated motor truck, best decorated automobile and best horse-drawn wagon. The parade ended at the picnic grounds in Grand Canyon Park, North Richmond, where all the members of the Builders' Exchange congregated with their friends and families and engaged in the usual games and diversions, one of the main events being a baseball game between teams of the plasterers and the marble dealers.

The general committee in charge of the event consisted of Wm. Makin, chairman; E. G. Hunt, Frank Kennedy, L. C. Fraser, J. H. Pedgrift, T. D. Sexton and Frank Robinson.

Jacksonville Builders' Association

The Master Builders' Association of Jacksonville, Fla., has just received its charter and officers for the ensuing year are as follows:

President.....W. P. Richardson.
First Vice-President.....W. T. Hadlow.
Second Vice-President.....N. L. Snelson.
Secretary-Treasurer.....E. N. Chamberlain.

The other incorporators are H. C. Buckland, L. M. Boykin, J. B. Cox, Frank Richardson, O. P. Woodcock, R. J. Galespie, C. Willcox and Carl Holton, who, with the officers of the association, form the Board of Directors.

The meetings of the association will be held the first Tuesday of each month in the rooms of the association on East Bay Street.

Builders of Twin Cities Hold Joint Picnic

For the first time in the history of the organizations the Builders' Exchanges of St. Paul and Minneapolis held a joint picnic on Saturday, July 12, at Spring Park, Lake Minnetonka. The program of field events had been prepared with a great deal of care, and after the members and their friends reached the park they indulged in contests of various kinds, for which prizes were awarded.

The most important event from the viewpoint of many present was the baseball game between the Minneapolis and St. Paul Exchanges for a loving cup. Later there was a tug of war between representatives of the two cities, and after that the competition was removed to the lake front for a boat race.

The affair was enjoyable in every way, and much credit is due Secretary Eugene Young, of the Minneapolis Build-

ers and Traders' Exchange, for the manner in which he discharged the many duties devolving upon him.

Ohio's New Lien Law

The Builders and Traders' Exchange of Cincinnati is distributing with its compliments a pamphlet history and synopsis of the new mechanics' lien of Ohio, which goes into effect the first of August. The text of the law occupies the body of the page, while in the broad margin are remarks calculated to facilitate reference. The general feeling among local contractors and architects is that the law is a decidedly complicated affair and much curiosity is being manifested as to its effect in the building world.

The Pittsburgh Builders' Exchange

At a recent meeting of the Builders' Exchange, the headquarters of which are now located in the Fulton Building, an instructive paper on the "General Advance of Fire-proof Construction as Shown by the Use of Reinforced Concrete," was read by J. A. Ferguson, an engineer in the Bureau of Building Inspection.

A committee has been named to take charge of the work of increasing the membership, and Secretary Tate, who recently took office, expects to make the exchange the most popular place for contractors and builders in the city.

Detroit Builders' Exchange Takes a Holiday

The members and friends of the Builders and Traders' Exchange of Detroit, Mich., to the number of about 500, held their "outing" on June 17 at Tashmoo Park, this being the third annual affair of the exchange. The weather was ideal for an "outing" and the excursionists were favored with a refreshing breeze from the time they first passed Belle Isle until their return in the evening. Mayor Marx was the guest of George H. Clippert, president of the exchange, and other guests included President George C. Schroeter and Secretary W. G. Martin of the Builders' Exchange at Grand Rapids. Games and races were the order of the day, and the "outing" was highly successful in every way. In the first ball game the team representing Court District No. 3279, Independent Order of Foresters, defeated the Builders' Exchange team by a score of 11 to 4. In the ball game between the "Fats" and the "Leans," the former were the losers by a score of 2 to 6. There were boys' and girls' races, fatmen's race, novelty race, obstacle race and tug-of-war. In the latter the building contractors beat the builders supply dealers. The prizes were distributed on the return trip by A. F. Pudrith.

The committee in charge of arrangements for the day consisted of Fred L. Hall, Charles A. Bowen, secretary of the exchange, H. B. Holden, J. W. Robinson and W. W. Norton.

Birmingham Builders Exchange

At a recent meeting of the board of directors of the Builders' Exchange of Birmingham, Ala., it was decided to hold the annual "outing" on Thursday, August 7.

The exchange publishes a Weekly Record, one of the features of it being a list of the buildings for which permits are issued during the week, with the location, estimated cost and name of contractor securing the work.

The Canton Builders Exchange

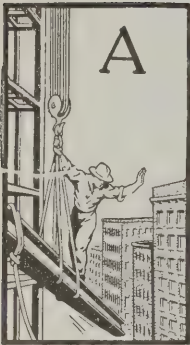
The Builders Exchange at Canton, Ohio, is establishing a library of catalogues and samples of builders' supplies and materials and the officials are anxious to have manufacturers of any article or material entering into the construction of buildings forward their printed matter for the library.

The members and friends of the Master Carpenters Association of the Oranges held their fifth annual outing at Lake Hopatcong, N. J., June 26. Music, dancing and boating contests were features of the day.

In planing end grain never run the plane entirely across the end, but work from both edges toward the center of the piece. This prevents the splitting of the corners.

A BRIEF REVIEW OF THE BUILDING SITUATION

What Reports Show as to Building Activity in Leading Centers of Trade as Compared with June a Year Ago



ALTHOUGH ultra-conservatism of bankers in making loans has resulted in a marked decrease of building construction in many portions of the northeastern section of the United States; the value of improvements for which building permits were issued during the month of June compares very favorably in most of the large cities of this section with the corresponding figures of a year ago. In Pittsburgh there is shown an increase of 238 per cent. over the corresponding figures of last year, but this increase is mainly due to a permit granted for the erection of a large department store. Boston shows an increase of 47 per cent. and Baltimore 43 per cent., while Philadelphia exceeds the figures of last year by 8 per cent. In Greater New York, however, a serious decline in building operations is apparent, the figures for June, 1913, falling below those of the corresponding month of last year by 56 per cent. Most of this loss is made by the Borough of Manhattan. The total of the Bronx is also unfavorable, while Brooklyn makes a better showing. The increase of 8 per cent. in the case of Philadelphia is remarkable in view of the fact that the curtailment of dwelling operations, begun last year, is being maintained. The total for the month of June in Philadelphia has been exceeded only three times during the past decade for the corresponding month. The favorable showing is largely due to the increase in the construction of manufacturing plants. In the case of Baltimore, although the figures for June are below those for May, the report of building inspector Clarence L. Stubbs shows a particularly healthy condition of building operations. The June activity eclipses in volume that of any other month for the present year with the exception noted. An idea of the building activity in leading cities of this section may be gained from a glance at the accompanying table:

NORTHEASTERN CITIES

	1913		1912	
	No. of Bldgs.	Estimated Cost.	No. of Bldgs.	Estimated Cost.
New York (Manhattan and Bronx)	386	\$6,967,655	453	\$15,781,595
Boston	493	6,946,000	417	4,725,000
Philadelphia	1,450	4,188,890	1,406	3,877,535
Pittsburgh	343	3,750,072	379	1,111,528
Brooklyn	1,000	3,065,600	1,024	3,251,277
Rochester	319	1,444,103	392	1,251,406
Newark	265	1,089,772	275	1,099,276
Baltimore	...	746,567	199	522,751
Springfield, Mass.	146	614,015	124	484,431
Worcester	190	537,973	202	769,527
Troy, N. Y.	63	524,358	56	60,116
New Haven	101	341,776	127	388,409
Hartford, Conn.	114	319,580	121	1,926,140
Portland, Me.	39	108,610	35	89,775
Wilkes-Barre	43	88,272	49	751,185
Paterson, N. J.	42	84,524	96	210,367
Harrisburg	23	81,275	27	119,830

In the southeastern states reports are generally favorable, the most noticeable gain being in the case of Charlotte, N. C., where an increase of 76 per cent. is shown over the corresponding figures of June, 1912, due largely to the placing of a contract for a large hotel in that city. In the north-central section of the country Chicago and Milwaukee show decreases of 30 and 53 per cent. respectively, while the most noticeable gain is in the case of Cincinnati, which records 71 per cent. increase over June, 1912. Minneapolis gained 38 per cent., St. Paul 3 per cent., Grand Rapids 33 per cent., Des Moines 158 per cent. and Toledo 7 per cent.; while losses were recorded as follows: Omaha 44, Kansas City 32, Indianapolis 7. The decreases in this section are due in many instances to labor difficulties, particularly in the case of Chicago, where a lockout by the building contractors affected about 25,000 workmen on large structures in that city. In the case of Milwaukee the poor showing is largely discounted by the fact that the construction last year of the building of the Northwestern Mutual Life Insurance Company at a cost of \$2,200,000 brought the June total above the normal figure. The large increase in the repairs and altera-

tions to frame buildings in this section of the country is largely due to the damage caused by the recent flood, where in many cases permits for the repair for flood damage were issued without payment of the customary fee.

NORTH CENTRAL CITIES

	1913		1912	
	No. of Bldgs.	Estimated Cost.	No. of Bldgs.	Estimated Cost.
Chicago	1,069	\$7,372,000	1,271	\$10,653,900
St. Louis	789	2,196,415	822	1,931,076
Minneapolis	652	1,808,645	674	1,328,125
Milwaukee	400	1,481,580	544	3,187,495
Cincinnati	1,282	1,392,625	1,325	814,346
St. Paul	393	1,060,530	429	1,024,892
Indianapolis	572	952,025	490	1,038,150
Columbus	373	567,791	252	579,116
Toledo	228	404,651	205	385,958
Grand Rapids, Mich.	179	362,707	149	271,420
Omaha	131	339,650	146	606,845
Fort Wayne	108	273,035	103	300,980
Des Moines	87	230,350	50	89,010
Duluth	163	145,284	134	244,105
Evansville	120	141,025	140	222,300
Lincoln, Neb.	40	121,610	61	137,160
Davenport	34	94,450	31	151,500
Peoria	30	90,650	52	153,465
South Bend	45	56,135	36	42,060
Springfield, Ill.	30	47,270	47	110,945

New Orleans leads the cities of the South Central portion of the country in point of gain over the figures of June, 1912, with a total of 174 per cent. increase for June, 1913. St. Louis gained 14 per cent.; Dallas, Tex., and Birmingham, Ala., show gains of 66 and 60 per cent. respectively over the figures of the corresponding month of last year, while Louisville, Ky., shows a loss of 54 per cent. and Kansas City of 32 per cent. Memphis holds its own with a gain of 1 per cent. over June of last year. Reports from the state of Texas indicate a generally healthy condition. Substantial increases are reported in Fort Worth, Dallas, and Houston. San Antonio, however, reports a slight decrease over the figures of last year.

SOUTH CENTRAL CITIES

	1913		1912	
	No. of Bldgs.	Estimated Cost.	No. of Bldgs.	Estimated Cost.
Dallas	196	\$936,015	148	\$561,914
Kansas City	316	904,375	435	1,342,502
Memphis	267	715,643	326	709,327
New Orleans	...	643,264	...	234,637
Birmingham, Ala.	285	577,189	227	359,235
Louisville	203	367,780	239	807,670
Chattanooga	168	132,715	165	47,920
Topeka	47	51,565	69	130,845
St. Joseph, Mo.	60	48,914	115	227,692

The smaller cities of the Pacific Slope show a much more healthy situation than the larger cities. Of the latter, Seattle, with 14 per cent. gain over the figures of June, 1912, is the only one which will please the optimist. In the case of Seattle, a slight increase in detached residence construction is to be noted, as also in the case of public buildings, churches, etc., while the figures for warehouse and factory building construction fall far below those of June, 1912. San Francisco and Portland, Ore., show decreases of 18 and 14 per cent. respectively. Tacoma follows with an increase over the figures of last year of 454 per cent., while Oakland and Spokane show decreases of 48 and 4 per cent. respectively.

CITIES OF THE PACIFIC SLOPE

	1913		1912	
	No. of Bldgs.	Estimated Cost.	No. of Bldgs.	Estimated Cost.
San Francisco	456	\$1,675,554	514	\$2,054,542
Portland, Ore.	472	1,001,415	643	1,176,605
Seattle	797	897,310	809	781,915
Sacramento	121	558,310	79	157,107
Tacoma	159	525,884	128	94,827
Oakland, Cal.	280	464,480	386	894,734
Spokane	66	411,785	73	430,934
Berkeley	79	204,800	85	169,850
Los Angeles	1,280	2,419,784	1,391	3,488,337
San Diego	269	1,018,700	359	657,263
Pasadena	124	159,014	138	309,598
Stockton	25	157,415	40	78,380
San José	28	29,290	45	46,315

A poor showing is made by the cities of southern California with the exception of San Diego, in which the increase is 55 per cent. Los Angeles shows a decrease of 30 per cent. Pasadena reflects the dullness of Los Angeles with a loss of 48 per cent.

BUILDERS' APPLIANCES AND EQUIPMENT

Some Things of Seasonable Interest to Those Having
to Do with the Building Business

Richards-Wilcox Rapid Acting Vise

A vise which is of special interest to carpenters, builders, cabinet makers and others, and which embodies some new and improved features, is the device illustrated in Fig. 1 of the engravings. It is made by the Richards-Wilcox Mfg. Company, Aurora, Ill., and is equipped with the company's new two-piece cam-operated nut. This nut is a new invention and is composed of only two pieces

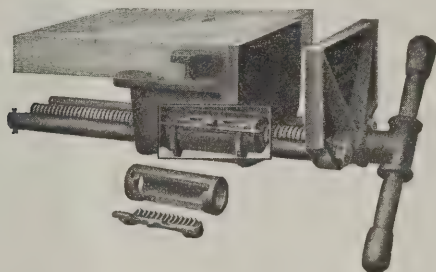


Fig. 1—General View of Richards-Wilcox Rapid Acting Vise

as may be seen from the illustration where the two parts in question are shown just below the vise. The mechanism of the nut is referred to as simple and absolutely reliable in operation. The nut proper is phosphor bronze while the sleeve is made of grey iron. The nut is released and completely disengaged when pressure on the work is removed by a slight reverse movement of the handle. When on the other hand pressure is applied the nut engages and locks the screw firmly and is held rigidly in position. The adjustment is instantaneous and there is nothing about the nut to get out of order. The guides of the vise are of cold rolled steel and the jaws are of grey iron with working surfaces ground and finished. The special design of the ribs on the jaws secures a minimum deflection or spring under pressure as well as a minimum weight. The head or side vise here illustrated is made in two sizes, the No. 1 having jaws 7 in. wide, 4 in. deep and open 10 in., while No. 2 has jaws 10 in. wide, 5 in. deep and open 12 in. Either type can be made specially to open any desired length and the jaws can be furnished with maple faces if desired.

A pamphlet which the company has issued not only illustrates and describes this particular vise but also various others manufactured by the company, as well as several styles of manual training benches.

The "Red Devil" Self-Oiling Glass Cutter

A new and improved self-oiling glass cutter with turret head has just been added to the already extensive assortment of "Red Devil" glaziers' and drop forged tools placed upon the market by the Smith & Hemenway Company, 150 Chambers street, New York City. Unlike other glass cutters of this type the manufacturer uses a very hard tempered pinion so that the wheels run uniform and true. This can be adjusted to use either 1, 2, 3, 4, 5 or 6 indicated on the dial in Fig. 2, which represents a general view of the cutter, thereby securing the full benefit of the service of all wheels. The oiling device in this little tool is behind the six wheels indicated by the numbers on the dial. The frame is so designed that it protects the wheels and is said to prevent them from coming in contact with moisture. The company has adopted the scientific handle

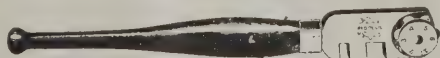


Fig. 2—The "Red Devil" Self-Oiling Glass Cutter

which is universally used in connection with its glass cutters. The tool is attractive in appearance, having a solid steel head—not cast iron—and is finished, coppered and

nicked. We understand that the company makes use in this tool of the highest class "Red Devil" hand-honed wheels which it manufactures. The self-oiling glass cutter is meeting with a very gratifying reception at the hands of the trade and is being shipped to all parts of the world. The goods are packed in specially prepared paraffin paper—a dozen in a box.

Neponset Proslate Roofing

A form of roofing which is especially intended for cottages, club houses, garages and other structures which call for an artistic covering is offered under the name of "Neponset Proslate," by Bird & Son, 16 River street, East Walpole, Mass. It is a colored roofing and gives not only a very handsome effect but is also said to afford positive fire protection for the building it covers, owing to the fact that the material is fire-resisting. Neponset Proslate is of the same quality as Neponset Paroid and besides being suited for the kind of buildings above mentioned it is also used on porch and veranda roofs which are too flat for shingles.

New Model of Parks Combination Woodworker

We present in Fig. 3 of the illustrations a general view of a new model of combination machine which has just been placed on the market by the Parks Ball Bearing Machine Company, Station "A," Cincinnati, Ohio. Convenience of operation has always been the hobby of Mr. Parks since he went to Cincinnati from the backwoods of Kentucky some 25 years ago, since which time he has developed labor-saving combinations for small woodworking shops and for portable use, and he is justly pleased with the knowledge that his results have been so successful. The new combination here shown adds a jig saw and sand disk on a separate shaft that is operated independently of the other parts of the machine. The engine has been

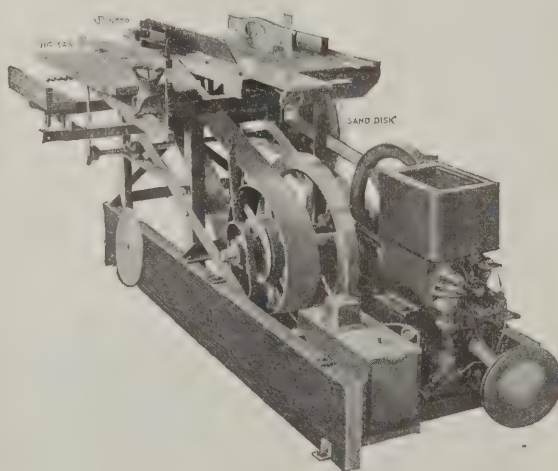


Fig. 3—New Model of Parks Combination Woodworker

placed where it is convenient of access and easy to start. A friction clutch is provided for starting and stopping the circular saw and jointer. The plates of the jointer attachment are 6 in. wide, of open-hearth steel and ground to a true finished surface. The rear plate is 2½ ft. long and the front one 2 ft. long. Both plates are furnished with hand wheel screws for raising and lowering to adjust for the depth of cut. The tilting guide is light, strong and accurate and easily adjusted from zero up to 18 in. It tilts to 45 degrees and is securely locked with a hand wheel. It slides over the jointer and can be used for circular saw. It can be quickly taken off by loosening one hand wheel on the under side. The boring attachment clearly shown

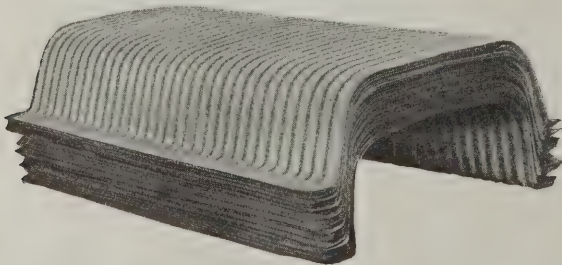
in the illustration consists of an adjustable sliding table to hold material being bored and the chuck is attached to the end of the saw mandrel. Provision is made to regulate the depth of bore and the table can be lowered to take in $2\frac{1}{4}$ in. below the center of the bit. The jig saw can be removed by loosening three bolts. The saw table is made of heavy angle steel and is bolted to two 2 x 10 bases and is one of the patented features of the machine. The table top is made of channel steel ground to a true surface. The angle steel on each side of the table makes a substantial support to which to bolt wood extensions for working long stuff. The table is hinged in the rear to raise and lower, adjusting the depth of cut, and has an opening for a 14 in. saw which will cut 5 in. deep. The rip guide has a convenient adjustment to cut any width up to 22 in. and is securely held in line with the saw by two hand wheels in front of the table. The cross cut guide is mounted on a steel bar which slides in a groove in such a way as to do accurate work. It has an angle adjustment of 45 degrees and is provided with adjustable stop for cutting to length. When working long timbers a brace can be connected below the material, making a strong, substantial and accurate guide.

High Grade Building Material

A colonnade-treated opening between two rooms in a house such as the living room and the dining room furnishes a sufficient line of separation between such rooms and at the same time, because of the fact that the view is practically unobstructed, the house appears far more spacious and roomy than would be the case with a solid partition and a wide doorway. A number of well chosen designs of colonnades, grilles, arches, etc., are contained in catalog No. 12, just issued by the Huber Builders' Material Co., 48-50 Vine street, Cincinnati, Ohio. A built-in sideboard, made in yellow pine and also in plain oak, hand smoothed, ready for finishing, is a feature of the work. It is shipped in two sections ready to set in place and requires a wall opening 7 ft. x 5 ft. with a depth of wall opening of 14 in. The height from floor to counter is 2 ft. 9 in. The shelves are adjustable and the cabinet is backed with tongue and grooved beaded ceiling. It is provided with a beveled polished plate mirror. Some valuable suggestions and facts concerning trade terms, sizes and usages are contained in the early portion of the catalog which cannot fail to interest every one connected with the building of houses. A number of pages are devoted to the subject of interior trim, doors, windows, builders' hardware, screen doors, parquet flooring, ornamental church windows, mantels, floor tiles, etc.

Berger's New Corrugated Steel Core

Designed for use in either a steel frame or reinforced concrete type of building and to take the place of hollow tile a corrugated steel core is being placed on the market by the Berger Mfg. Company, Canton, Ohio. Fig. 4 of the accompanying illustrations shows fifty of these cores stacked ready for shipment and sufficient to cover an area of 325 sq. ft. In long span concrete floor construction the corrugated core serves the double purpose of a form and a core to save concrete, useless in resisting stresses, thus decreasing the dead floor load. The cores made in light gauges are intended to remain in the floor, but they can be made in heavy gauges and used over again indefinitely. The floor loads are carried to the girders by



Berger's New Corrugated Steel Core—Fig. 4—Nest of 50 Cores Ready for Shipment

the reinforced concrete joists formed by use of the cores. The design of these reinforced concrete joists is worked out on the same principle as the design of the ordinary I-beam. The ceiling furring or rods is suspended by wire ceiling hangers, holes for which are provided in the cores. Expanded metal lath is then wired to the furring, giving an even uniform surface for plastering. The shape of the wire ceiling hanger loop is such that when firmly imbedded to the concrete the ceiling hanger cannot

elongate and allow the ceiling to sag, nor is it dependent upon the core for its support. The upper part of Fig. 5 represents a side view and the lower illustration a section showing the application of Berger's corrugated cores to concrete floor construction.

The advantages claimed for the use of the corrugated steel cores are the following: The designer may span the floor from column girder to column girder, thus giving an ideal beam layout. The dead floor load can be greatly reduced, which means that the size of girders, columns, footings and foundations can be reduced with a corre-

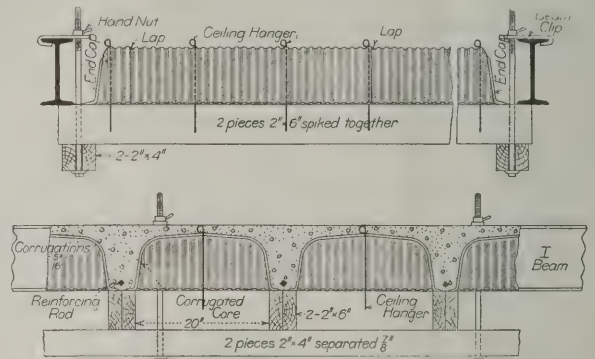
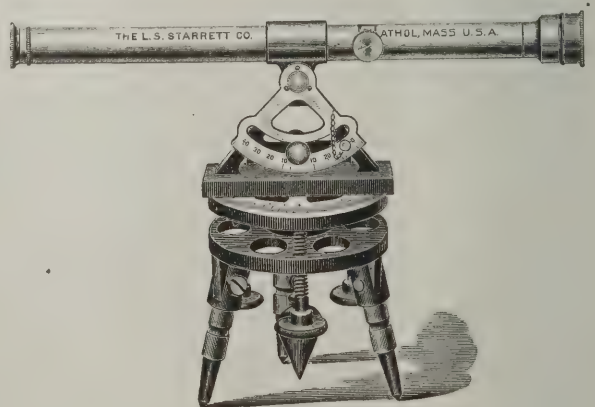


Fig. 5—Side and Sectional Views of Corrugated Cores as Applied to Concrete Floor Construction

sponding reduction in cost. The cost of centering the form work is cut to a minimum as only skeleton centering is required. The cores can be easily and economically handled on the job owing to their light weight. No breakage can occur and no concrete is wasted. It is stated that a carload of the cores in covering capacity is equal to approximately 20 carloads of hollow tile. This reduces the item of freight and the cost of handling on the job. Because of the dead air spaces the floor is sound proof to a high degree. The cores are made of one piece of sheet steel 28 gauge and heavier, in depths of 6 to 12 inches, in widths of 24 inches, and in lengths up to 3 ft. End caps are furnished of similar construction.

Use of the Transit in Laying Out Building Foundations

Many a builder has often been seriously handicapped in starting work because of inability to lay out building foundations or building lots. The high cost of the engineer's transit has made the purchase of this instrument out of the question. Waiting for a civil engineer to do the job for him has caused annoyance as well as delay. But he can now obtain a relatively inexpensive transit with which



Use of Transit in Laying Out Building Foundations—Fig. 6—General View of the Starrett Transit

he can approach the problem with confidence. Such an instrument as the Starrett, for instance, shown in Fig. 6, will enable him to lay out building foundations or building lots and do it at his own convenience.

The use of this simple instrument is not nearly as difficult as may be imagined. Confusing devices although valuable to the engineer have been omitted. Nevertheless a Starrett transit will do the ordinary work of the builder and farmer.

One of the first things to learn in using the transit is its initial adjustment; that is, making the transit perfectly level. To do this the legs of the instrument are first set into the ground firmly so that the adjustment may not be disturbed. It is then brought to a level by adjusting the lower parts of the extension legs. Greater refinement in

\$1210

**Buys Lumber,
Millwork, Hard-
ware and Paint
for this Beautiful
Bungalow**



House Plan No. 106

More Profit Per Job!

Note the low cost of Lumber and Millwork for this beautiful Bungalow and the fine 8-room Stucco House illustrated on this page. Thousands of carpenters and contractors are making a **bigger net profit on every job** than ever before by buying their building material at **wholesale prices** direct from our great Building Material Plant.

The contractor's extra profit on a single house bill averages from \$300 to \$500, and sometimes runs over \$1,000. Isn't that worth while? Here's the kind of letters we receive right along from contractors and builders:

Brownville, N. Y., May 25, 1912.
Gordon-Van Tine Company, Davenport, Iowa.

Gentlemen: I received shipment on the 22nd, all in fine condition. I was surprised at the good quality of the material in same. Saved \$600 on this deal and got better goods.

DANIEL WOODWARD.

Lebanon, Neb., November 14, 1912.

Gordon-Van Tine Company, Davenport, Iowa.

Gentlemen: The material I have bought of you is just as represented. Has given the best of satisfaction, and your prices are

the cheapest I can find anywhere. I save about one-half on the millwork since I commenced ordering from you.

D. A. McCARTY,
Contractor and Builder.

Bogota, N. J., February 5, 1912.

Gordon-Van Tine Company, Davenport, Iowa:

Gentlemen: I am entirely satisfied with the material you furnished and I can safely recommend your firm to anyone wishing to save money and at the same time get the best of material. It was all that you recommended it to be.

JOSEPH MALLON.

Fall Offers—Just Out—5,000 Bargains

Write at Once for Our Latest Quotations

We have at the present moment the largest and finest stock in the history of our business. Our Fall Quotations are on a bed-rock basis—offering to Contractors and Builders a sensational bargain opportunity.

This stock includes everything that goes into a building—Sash, Doors, Lumber, Mouldings, Hardware, Paints and Oils, Mantels and Grates, Grilles and Colonades, Stair Work, Porch Work, Finishing Lumber, Fancy Doors, Art Glass Windows, Cupboards, Built-in Sideboards, Ceiling, Flooring, Plaster Board, Roofing, Building Paper and the thousand-and-one items that go to make up a complete house.

We have unexcelled facilities for getting out special millwork at lowest prices, in double-quick time.

We guarantee quality, safe delivery and satisfaction.

We will be glad to refer you to contractors near you who have put Gordon-Van Tine Quality, Prices and Service to the test. Don't fail to write for new Fall Catalog, with latest price quotations.

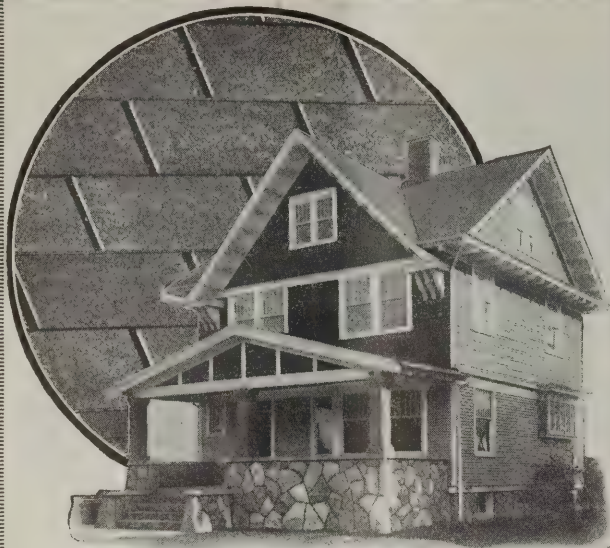
Gordon-Van Tine Company, 661 Federal Street, Davenport, Iowa



House Plan No. 124

\$1449

**Buys All Lumber,
Millwork, Hard-
ware and Paint for
this Handsome
8-Room Stucco House**



Beautiful Houses from Illinois to Massachusetts are roofed with Reynolds Flexible Asphalt Shingles

A multitude of pretentious residences in a score of states are giving ample proof of the long-lasting surface of Reynolds Flexible Asphalt Shingles. Every type of modern home can be protected and beautified, at lower cost, with these time-tried, weather-tested shingles. They withstand the ravages of driving rain, pelting hail, hottest sun and heaviest snow without warping, cracking, splitting, curling or blowing off. Sparks cannot set them on fire. Long exposure cannot dull their rich color. Adaptable to every style of pitched roof, and make possible unusual architectural effects, such as roll ends, thatch effects and rounded corners.

Reynolds Asphalt Shingles

Guaranteed for 10 years—will last many years longer

Rough-surfaced weather defiers made of crushed slate or granite securely embedded in pure asphalt. Natural colors of garnet, red or gray-green which *never fade and never need painting*. We are the original makers of flexible asphalt slate shingles and tested them for ten years before putting them on the market. Right here in Grand Rapids, where climatic changes are extreme, our shingles, after 10 years' exposure to all kinds of weather, look as good as the day they were nailed on. They are uniform in size—8 inches by 12½ inches—and are laid 4 inches to the weather. Easily and quickly laid. Every far-seeing architect and builder should specify and use them.

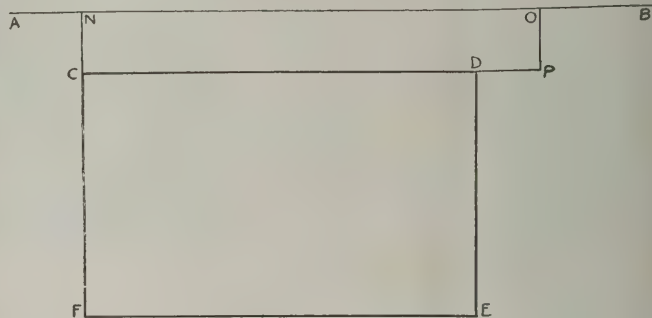
Let us send you a booklet showing photographs of modern houses roofed with Reynolds Asphalt Shingles—signed opinions of owners are included. Also opinions of leading architects and builders. Write for a copy TO-DAY.

H.M. Reynolds Asphalt Shingle Company

159 Grant Street, West, Grand Rapids, Mich.

Established 1868

level is secured by adjusting the leveling screws between the plate and tripod head. This is done by bringing the level over one of the leveling screws and turning one screw in and another out until the bubble appears in the center of the level glass. Then turn the sight tube or telescope through an angle of about 90 degrees, and again adjust the bubble to the center of the glass by means of two leveling screws. This operation should be continued until the bub-



Use of Transit in Laying Out Building Foundations—Fig. 7 Showing Method of Placing Stakes

ble stands in the center of the glass, no matter what direction the level may be turned.

By means of a plumb bob, suspended from the hook under the tripod head, the center of the instrument is set directly over the station mark or corner of the lot or building to be laid out. The transit is then carefully leveled as above, after which neither the hands nor the coat of the operator should be allowed to touch the legs of the instrument.

If AB in Fig. 2 represents the street line and the corner of the proposed building is at C , which is distant from the street line, NC , then a distance OP equal to NC should be measured from the street line at some point O which is at least as far from N as the length of the proposed building. Set a stake at P then the line CP will be parallel with the street. A distance from C in a straight line toward P is next laid off, equal in length to the building or lot; this determines the two front corners C and D .

To get the line at right angles to CD , leave the sights still directed on the stake at P and the sight tube clamped by means of clamp screw and nut. Then turn the graduated arc until the index finger can be passed into the zero mark by means of the push pin. Screw the graduated arc in that position by clamping the lever. Then turn the eye

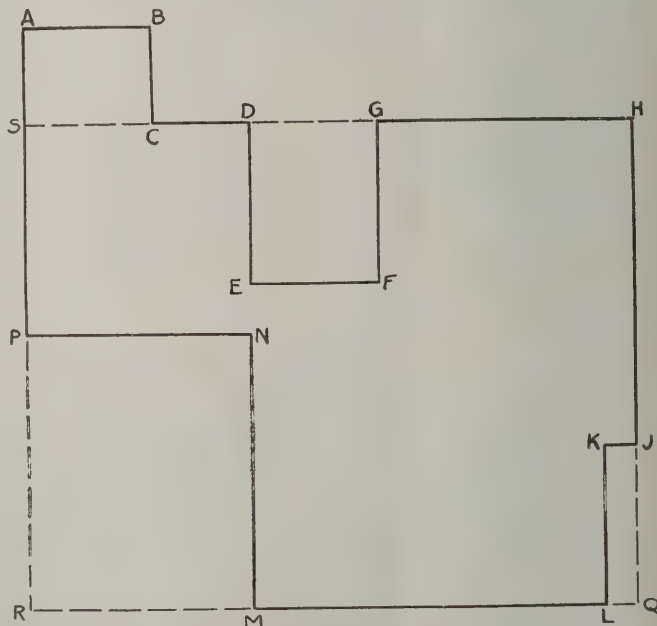
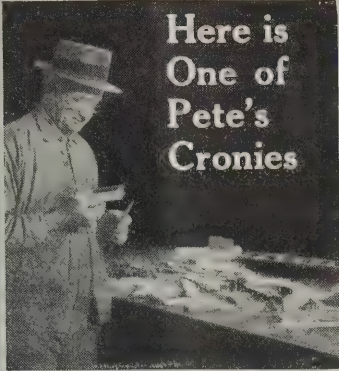


Fig. 8—Laying Out Foundations for an Irregular Shaped Building

end of the sight tube or telescope to the left until it has turned a right angle, or 90°. A sight along its new position will give the line CF on which the required distance is measured off to determine the corner F .

Next move the transit to D and level it up as before. Direct the sights to a rod or nail on the stake at corner C . Clamp the transit in this position and bring the zero of the arc to the index finger as before. Then turn the eye end of the sight tube or telescope to the right until the index finger as before. Then turn the eye end of the sight

(Continued on page 48)



Here is
One of
Pete's
Cronies

A fellow workman in the pattern shop—if there is one thing he prides himself on it is the condition of his tools—so, then, he, too, uses

Carborundum Sharpening Stones

The Round Combination Bench Stone, the Slip and Gouge Stones.—He says they make his good tools *better* tools, because

they cut quick and clean—give a keen, smooth edge—never glaze or fill—and they last.

Carborundum Sharpening Stones are work-bench and tool-kit necessities. At your hardware dealer or order direct.



The Carborundum Company
Niagara Falls, N. Y.



A Mould for Plaster Cornice of Rooms

WILL you examine this new device—"The Monarch Patent Cornice Mould," if we send it **FREE**—even the transportation charges fully prepaid?

I know what it is to fuss around after you get to the corners of the room, to make the cornices, etc. I was up against that for years on every job. At last I put my thinking cap on. Took me a year or more to get the right idea, and another year to try the device out thoroughly to see that it worked and worked right.

I **know** now that my mould will make straight cornices and perfect corners every time without your using any other tools, and I **know** what I'm talking about when I say that my mould will save its cost on every job. **THE MOULD WILL MAKE IT EASY FOR YOU TO UNDERBID THE OTHER FELLOW AND YET LEAVE YOU AS GOOD A PROFIT AS HE HAD FIGURED ON MAKING WITHOUT THE MOULD.**

I don't care if you're "from Missouri!" or elsewhere. I can show you—and I'm willing to show you **without it costing you a cent**. Just fill in the coupon, mail it, and the trick's done. You'll get a mould promptly for **five days' free trial**. Convince yourself thoroughly before you spend a penny.

And here's an added special. To get the mould around the country quickly. I am going to make a **special 40% discount on the first 500 sets**. Regular price is \$50. Forty per cent. off makes the cost price \$30, or \$33 if in installments of \$3 a month for 11 months. Either way suits me—I'm willing to trust my brother carpenters, builders and contractors.

YOU need this mould in your business—it will save its cost on nearly every job—and you can pay for it piecemeal out of the saving.

TIMOTHY F. HORAN

10 MAPLE STREET

COOPERSTOWN, N. Y.

.....1913

Timothy F. Horan,
10 Maple St., Cooperstown, N. Y.

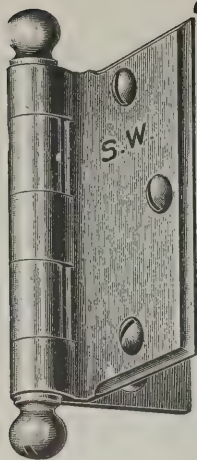
Dear Sir:—Please send me the Monarch Patent Cornice Mould free for 5 days' trial. At the end of that time I will either return the Mould or else remit \$30 (cash price of \$50, less 40% special discount) or remit \$3 and then \$3 every month thereafter for 10 months (making \$33 special installment offer).

I understand the Mould will make straight cornices and perfect corners; will make any style and size of cornice with complete corners, as well as straight work.

Signed

Address

Send no money—merely
mail the coupon—today.



Time and Labor Saved and
the Owner Satisfied

STANLEY'S
No. 165

Ornamental Surface Butt

BEVELED EDGE
UNEQUALED IN QUALITY

With these Butts it is not necessary to mortise the door, as the ornamental leaf screws on the surface.

The Butts can be changed to either right or left hand by simply unscrewing the slotted tip and reversing the pin. A screw driver is enclosed with each box that fits the slot in the tip, and can afterwards be fastened on your key ring. Sizes $1\frac{1}{2}$ to $4\frac{1}{2}$ inches.

The Guaranty



of Quality

Write us for a Handsome Booklet of
Wrought Steel Hardware

Department E.

THE STANLEY WORKS

NEW YORK NEW BRITAIN, CONN. CHICAGO

**THE
SIMONDS
SAW**

is built on honor. Every saw which leaves the Simonds factories is inspected and its quality is guaranteed.

**Ask Your
Dealer**

SIMONDS MFG. CO.
FITCHBURG, MASS.
CHICAGO, ILL.

tube or telescope to the right until the index finger has turned a right angle, or 90° . This will give the direction of DE on which line the width of the building or lot will be measured off, thus determining the corner E .

To prove the work and make sure that no errors have occurred, the transit should then be set up at E and if the distance EF equals the distance CD the work is proved to be correct. If either of these fails an error has been made, either in the measurements or in turning the angles. In this case the work must be repeated until it checks with itself.

Where the outline of the building is other than a rectangle, the procedure is just the same from one point to the next, but more points have to be arranged for and the final proving of the work is more likely to reveal a small error. It is usually advisable with an irregular shaped building, such as shown in Fig. 3 to lay out first a large rectangle which will comprise the entire building or a greater part of it. This is shown in Fig. 3 as the rectangle $HQR S$. Having this once established accurately, the remaining portion of the layout will consist in small rectangles, each of which can be laid out itself and proved separately. As will be noted in the figure, these other rectangles are respectively $JKLQ$, $MNPR$, $ABCS$, and $DEFG$. This happens to be the layout of a brick house built a great many years ago, before ideas of compactness were in vogue.

The "Han-Cot" Sash Mouse

Every carpenter having experienced the need of a satisfactory device for drawing sash cord through pulleys in window frames, Handley & Cotterman, 164 North Wabash

avenue, Chicago, Ill., have designed the article illustrated in Fig. 9 for this purpose. It is known as the "Han-Cot" sash mouse. The device consists of a steel chain having a weight on one end and a fastener on the other. The fastener is made of one piece of steel, with a sharp point or spur for holding the end of the sash cord and drawing it through. The chain is made of steel, has no open links and cannot be pulled apart. The weight is made of lead and the proper shape to go through the pulley readily. The total length is 59 inches and the weight only three ounces.

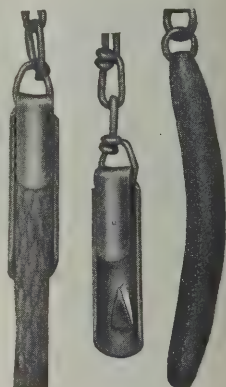


Fig. 9—The "Han-Cot" Sash Mouse, Showing Cord Fastener and Weight

Active Demand for Burt Ventilators

That there exists an active demand for the line of ventilators turned out by the Burt Mfg. Company, 212 Main street, Akron, Ohio, is evidenced by the large number of orders which the company is booking. Among the more important are the following: Sixty 24-in. ventilators for the Union Stock Yards Company, Omaha, Neb.; ninety 20-in. ventilators for the Jones & Lamson Machine Company, Springfield, Vt.; six 48-in. fan ventilators to be operated by direct connected motors for the East Pittsburgh, Pa., plant of the Westinghouse Electric & Mfg. Company; five 40-in. and one 18-in. ventilators for a school building in Metropolis, Ill.; three 36-in. ventilators for the State Agricultural station at Mandan, N. D.; one 48-in. fan ventilator for the Barrett Mfg. Company; six 54-in. metal top ventilators for the American Plate Glass Company, James City, Pa.; eight 16-in. ventilators for the Edmeston, N. Y., plant of the Borden Condensed Milk Company, and ten 12-inch ventilators for the Wason Manufacturing Company, Springfield, Mass., for use on railroad cars. This company has also received an order for two No. 3 Cross oil filters for the Bushwick High School, New York City.

"Norman" Hot Air Furnaces

A very attractive folder relating to "Norman" furnaces is being distributed by the Galusha Stove Company, Rochester, N. Y. The front page is embellished with a panel picture representing a winter scene where the snow covers the ground and the branches of the trees are laden with it, while a portion of the background is occupied by a mansion of stately proportions. The title reads "Norman furnaces—insure California within while Maine rages without." Among thoughtful people today the question of sanitary heat is one of the most important. The point is made that with the warm air system one does not require a plumber every few days to repair leaks and

(Continued on page 50)

TOOLS OF QUALITY

For 65 years—since 1848—we have been handling tools. We have studied them, worked with them and from our own experience we know that only good tools—tools with a reputation behind them—are the kind to use. They will stand the strain, last longer and give better satisfaction. For this reason we carry the cream of the market—Disston Saws, Russell Jennings Bits, Buck Bros'. Chisels, Hammond Hammers, Stanley Planes and scores of other brands equally as well known. You can get all of them from us and at moderate prices.



We have a special 200-page Catalog of Tools, No. 3097, which we will send to Tool Users.

HAMMACHER, SCHLEMMER & CO.
HARDWARE, TOOLS & SUPPLIES
4th Ave. & 13th St. NEW YORK, SINCE 1848.



Thousands of Carpenters, Apprentices, and Laborers Have Salaries Raised

You can be safe in judging what a man can do by what has been done—past performances—past records. In the files at the International Correspondence Schools are more than 27,000 letters that are witnesses to the marvelous results accomplished by students of the International Correspondence Schools. These letters came from all sorts and conditions of men who started with no more opportunities than you have—no more money—no more education, but today we find them in positions of responsibility and power.

A recent tabulation of the records of 1,000 students shows that the average salary at the time of enrolment for I. C. S. Courses was \$54 per month, but today, or at the time the letters of indorsement were written, the salaries have increased to an average of \$183 per month.

Such results are not due to chance. They are the reward of conscientious effort, and they should appeal to the ambitious, comfort-loving element of laboring people.

These men took time to study, took time to find the better and more modern ways of doing things, and these are what distinguish them today from the low-wage laborers.

There is not in all the world a greater force than the I. C. S. to put new hope in the hearts of laboring men and teach them to attain success.

The I. C. S. are ready and willing to help you. Are you willing to be helped? Then determine what you want to be and

Mark and Mail the Coupon NOW

International Correspondence Schools: Box 969, SCRANTON, PA.

Please explain, without further obligation on my part, how I can qualify for a larger salary and advancement to the position, trade, or profession before which I have marked X.

Architect	Estimating Clerk	Automobile Runn'g
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Structural Draftsman	Mechanical Drafts'n	Stenographer
Plum. & Heat. Con.	Stationary Eng.	Advertising Man
Supt. of Plumbing	Electrical Engineer	Window Trimming
Foreman Steam Fit.	Electric Lighting	Commerc'l Illustrat'g
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ESTABLISHED 1863

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TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file
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Philadelphia, Pa.

Owned and Operated by Nicholson File Company.



**Ask Your
Dealer**

for WHITE chisels. Don't
take anything else. If he
hasn't them drop us a card and
we will tell you who has.

We Guarantee

50% LONGER WEAR
50% LESS LABOR
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Ask any one who has used them. What kind
of chisel are you in need of right now? Let
us send you prices and tell you where you
can buy them.

THE L. & I. J. WHITE CO., Buffalo, N. Y.

freezing pipes. Direct radiation, it is claimed, means heating over again the foul air already in the room, while the use of the warm air system means bringing into the room a stream of fresh air warmed to a comfortable temperature. The "Norman" furnace is backed by 60 years of operation. The grates are triangular and at each one-third revolution they present a new surface for the fire and fresh air is permitted to easily pass to all sections of the grates, thus producing a perfect combustion of fuel. The combustion chamber of the "Norman" furnace is ideal, permitting a free mixture of the gas and air. The furnaces are constructed of selected iron and the result is a heater of the highest type and grade, which can be installed in the home at moderate cost. In the folder in question reference is made to three styles of furnaces, ranging in height from 52 to 56 in. inclusive, and with diameter of casing ranging from 48 to 49 in. The approximate heating capacity in cubic feet ranges from 15,000 to 28,000.

Accompanying the folder is an illustrated price book for 1913, this covering not only "Norman" furnaces but also stoves and ranges made under the same name.

Kees' Metal Building Corners

A metal building corner of such a nature that it cannot fail to strongly appeal to carpenters and builders wherever located has just been placed upon the market by the F. D. Kees Mfg. Company, Beatrice, Neb. Every carpenter appreciates what an annoying job it is to cut and bevel the ends of the weatherboarding in order to make a perfect miter at the corner and thus give to the house, when finished, that neat and attractive appearance at the corners which results from a first-class piece of work. No matter how skillfully the work may be done the joints are quite often likely to open in course of time, leaving small but unsightly crevices which later painting can only hide in part. These objectionable features, however, are claimed to be overcome by the use of Kees' Metal Building Corner, illustrated in Fig. 10 of the engravings, which represents the outside corner for 4-in. siding. The corners are made of galvanized iron shaped to fit the beveled corner formed by the siding and are pierced with nail holes so that they may be readily applied. The lower edges overlap and make a tight joint at the lower edge of the boards. The company points out that in using this device the siding is cut so as to reach about $\frac{1}{2}$ in. short at the corner and is then nailed on, after which the metal corners are applied to each course. If preferred, however, all the siding can be nailed on except at the corners and then the corners slipped into place and nailed afterward. The corner pieces extend along each board about 2 in. so that it is unnecessary to even square the ends of the boards. The claim is made that after the building is painted the metal corners are scarcely noticeable and sometimes the corners are painted like the trim which, of course, helps the exterior decorative effects.

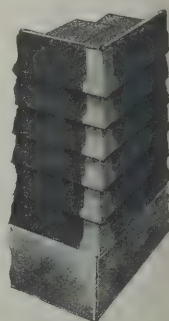


Fig. 10 — Kees' Metal Building Corners

The corners are made for 4 and 6-in. siding and for use on inside angles as well as outside corners. They are also used to finish the corners of shingled walls for "Common Sense" silos and for repairing old mitered corners. The shipping weight per one thousand for all styles of metal corners for 4-in. siding is 60 lb and for 6-in. siding it is 90 lb. A folder which the company has issued relating to the device also shows illustrations of a few of the many houses which have been finished with Kees' Metal Building Corners.

Safeguards for Woodworking Machinery

A comprehensive little pamphlet, 16 pages in number and dealing with safety devices for woodworking machinery, has recently been distributed by the J. A. Fay & Egan Company, 221 to 241 West Front street, Cincinnati, Ohio. This concern it may be interesting to state has for 83 years been exclusively engaged in the building of woodworking machinery and with this extended experience behind it in combination with its special efforts, has developed "safeguards" which provide efficient protection to the operator without hindering him in his work. In referring to safeguards the company has the following to say to users of woodworking machinery:

"We all know that accidents happen among users of machinery, but when the statistics compiled by one of the leading insurance companies tell us that more than 85,000 of our fellowmen are either killed or seriously injured yearly in the United States and that 50 per cent. is due

(Continued on page 52)

The image displays six technical drawings of different types of calipers, each labeled with a number:

- N°91:** A large caliper with a circular frame and a long, graduated beam.
- N°90:** A caliper with a circular frame and a long, graduated beam, similar to N°91 but with a different frame design.
- N°98:** A caliper with a circular frame and a long, graduated beam, featuring a different frame design.
- N°97:** A caliper with a circular frame and a long, graduated beam, featuring a different frame design.
- N°198:** A caliper with a circular frame and a long, graduated beam, featuring a different frame design.
- N°197:** A caliper with a circular frame and a long, graduated beam, featuring a different frame design.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

FREE BUILDING MATERIAL CATALOG

BOOK of HOUSE and BARN PLANS

I Can Save

**E CATALOG I Can Save
Every Contractor
Who Will Send for
These Books BIG
MONEY** Every contractor, car-
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Mail the coupon or a postal today for these books—be independent of local men and have your choice of

Over 8000 Bargains Like These

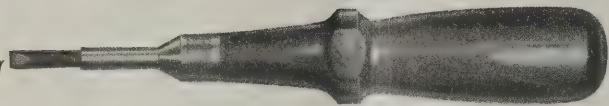
Plan Book No. 55

FOR SALE CHEAP

FLOORING FINISHING MACHINE. Good machine for any sawmill wishing to produce tongue and groove flooring.

THE PORTSMOUTH ENGINE CO.

Portsmouth, Ohio



The PRICE Automatic Brad Driver

For driving $\frac{1}{4}$ to 1-inch brads and small nails that are hard to hold—just place the brad in nozzle and PUSH. The handiest tool yet for stair builders, cabinet workers, inside finishers, etc. Fully guaranteed. At your dealers, or sent on approval for \$1.25.

THE TOM PRICE MFG. CO.

Cooper, Texas.



STOP THOSE RATTLING WINDOWS

Do away with sash weights, cords, pulleys and pocket frames and save money by using
AUTOMATIC SASH HOLDERS

Proved by Use—
Unexcelled for windows without pocket frames. Excellent for new windows.



Send for circular and prices, or \$1.00 for trial set prepaid; state approximate weight of sash.

AUTOMATIC SASH HOLDER MFG. CO., 46 Church St., New York.

A UNIQUE TIME SAVER

The Jackson Aluminum Line Level makes big saving of time and labor. Takes the place of the old-fashioned sixteen foot straight edge. May be carried in vest pocket. No contractor, builder, carpenter, etc., can afford to be without. Stretch line and hang the level on it—It's positively accurate. Complete outfit goes into neat leatherette case and consists of the level with 40-ft. line also spring clamp for attaching level to steel square or pocket rule, thereby serving as a plumb rule or bench level. Ask your dealer or send \$1.00 for outfit complete post paid. Send for Tool Catalog.

J. Woodwell Co., Sole Agts., 201-203 Wood St., Pittsburgh, Pa.

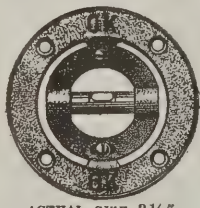


BUCK BROS.

Buck Brothers' Tools are LASTING tools—they keep their edge.

We make a full line which includes bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.

BUCK BROS., Milbury, Mass.



CLIMAX OF SIMPLICITY

The O.K. Adjustable Plumb or Level Fixture to be attached to 6 or 8 ft. plumb staff or straight-edge for plumbing door jambs, studing; leveling joist, foundations, etc. Made of high grade aluminum.

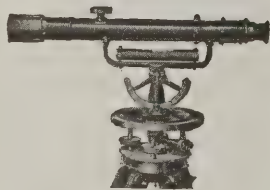
Don't waste your time and patience with the cumbersome plumb-bob. Send today for the O.K. Fixture—50c each or \$5 per doz. post paid, P.O. or express money order.

S. L. Stratton & Co.,

ACTUAL SIZE $3\frac{1}{4}$ ".

Box 776

Columbus, Ohio.



THE YANKEE Compound Level

Just the thing for a Builder.

Accurate—Low Priced.

FROST-ADAMS CO.

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Send for our catalogue

ELEVATORS Improved Quick and Easy Rising Steam Electric and Hand Power Safety

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Gus Taliaferro. Oklahoma City, Okla.

Branch Offices: 136 Liberty St., N. Y. 108 11th St., Omaha, Neb.



to unguarded mechanical appliances, we are willing to believe that the matter of safeguarding has become important if not serious. But not to the workman alone is the importance of protection. 'Enjoy life by helping others to do likewise.' Is it possible for a man who has lost a leg, arm, hand or even a finger to enjoy the associations of whole men when he is reminded at every turn of his deformity? No more is it possible for the employer, who has done nothing in the way of safeguarding his dangerous machinery enjoy life with a conscience burdened with the responsibility of injury through his neglect."

A Cheap Fence of Concrete Construction

A concrete fence which may prove of interest to some of our readers was recently designed by R. V. Moss, city surveyor of New York City, for the Glen Ridge Tennis Courts. A strong and durable fence of neat appearance was desired and one that could be quickly erected at low cost. In doing the work 3-in. I-beams 12 ft. 6 in. in length were sunk in the ground to a depth of 2 ft. 6 in., leaving 10 ft. of post above the surface. These were placed at 12 ft. 1 in. on centers. The flanges of these beams were wrapped with expanded metal lath to a height of 6 ft. above grade to carry cement plaster. A 2-in. x 3-in. spruce bottom rail was placed between the



Fig. 11—A Cheap Fence of Concrete Construction

posts along the ground and a top rail of the same size at a height of 6 ft. with rib-truss reinforcing plates made by the Berger Mfg. Co., Canton, Ohio, extended to cover the space between. The concrete was then applied on the reinforcing plates to a thickness of three inches.

Above the reinforced concrete portion of the fence wire netting is fastened to the height of 4 ft., making the entire height of the fence 10 ft., of which six feet is concrete and the remainder wire.

The cost of this type of fence is low, especially for the concrete portion of it which, in this case, is increased by the fact that the I-beam posts extend 4 ft. above the concrete to carry the netting.

The concrete portion alone cost about 25 or 30 cents per square foot, including the contractor's profit which made the cost of the 6-ft. fence from \$1.50 to \$1.80 per lineal foot.

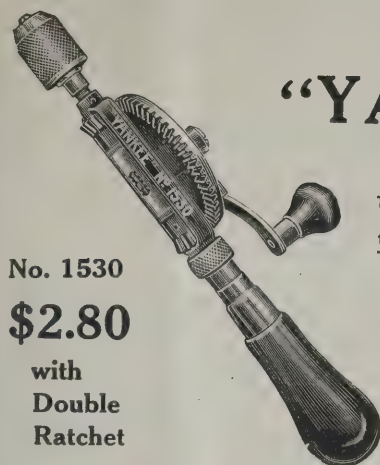
Forms for Concrete Green House Benches

Those of our readers who may be occasionally called upon to do greenhouse construction work are likely to be interested in the "forms" for building sectional concrete greenhouse benches which are being offered by McCaslin Brothers, Zanesville, Ohio, and for whom John C. Moninger Company, 900 Blackhawk street, are Chicago agents. The "forms" are adjustable, so that any width or length of slab can be made and the slabs can be turned out during the dull seasons, so that the contractor will have them ready to set up when they are needed. The "forms" work on the same principal as a block machine. The concrete is mixed as dry as possible, so that the "forms" can be removed at once. The material may be cinders or half cinders and half sand. The bench when made does not warp or rot; is easily installed, and if it settles it does not crack like a solid bench. If it is desirable to rearrange the greenhouse it can easily be done with the sectional bench. It has a systematic drainage exactly the same over the entire surface, so that there are no wet or dry spots.

Steel Ceilings in Spain

That the steel ceiling is making its way even in conservative old Spain is shown in the case of two half-tone

(Continued on page 54)



No. 1530
\$2.80
with
Double
Ratchet

You Can Get This "YANKEE" DRILL

with or without the Ratchet

Take it either way, this is the nicest little tool for most any kind of small drilling in wood or metal. It takes round shank drill points up to 3/16 inch diameter. The double ratchet tool No. 1530 is a great advantage in working at close quarters, but for ordinary all round work a No. 1430 will answer just as well. It is built on the same lines, as well made in every particular, but without the ratchet; hence the lower price. The gears are cut out of the solid metal of wide face, giving them extra strength and long wear. The magazine in the handle is quite ample for a good assortment of drill points.

Send for the "YANKEE" BOOK—a postal brings it.

NORTH BROS. MFG. CO., Lehigh Ave., Philadelphia, Pa.



No. 1430
\$1.75
without
Ratchet

MACK & CO.

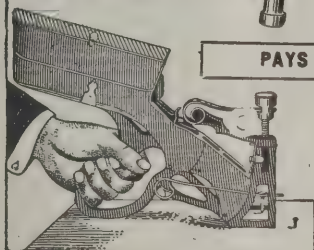


The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

Brown's Race
Rochester, N.Y.

Pearson's Automatic Shingle Nailer

Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. Throw nails in by the handful—holds about 600 nails—start nailing. Nails can be driven through tin or quite heavy sheet iron. Made in two sizes: The BLUE Nailer for 3d common No. 14 gauge wire nails.



PAYS ITS COST ON ONE JOB

The RED Nailer for 3d galvanized No. 13 gauge 1 1/4-inch wire nails. Order through your dealer or sent prepaid for \$5.00.

Money refunded if not as represented
PEARSON MFG. CO.
Robbinsdale, Minn.

SEND \$1.00

for this



remarkably handy tool

"The New Complete Saw Set"

embodying every practical, common-sense feature of all others, and these 2 features that no other saw set has: 1, adjustable side gauge to bring the point of each tooth under the anvil; 2, top clamp screw to regulate amount of set. Wearing surfaces made of hardened tool steel. Take advantage of the Parcels Post by sending \$1.00 for this attractive offer. We prepay postage.

Otis A. Smith

Rockfall, Conn.



Use Our

Folding and Adjustable Handle Draw Knife

It is adjustable to any position, adaptable to awkward places, absolutely rigid when set, handy and compact, a time-saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches. Write for prices and discounts.

A. J. Wilkinson & Co., 180-188 Washington St., Boston, Mass.



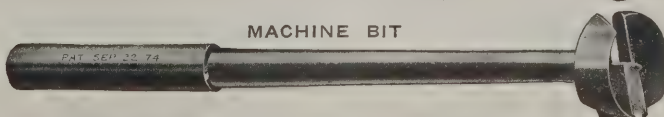
BRACE BIT

PAT. SEP 22, 1904
FEB 23, 1906

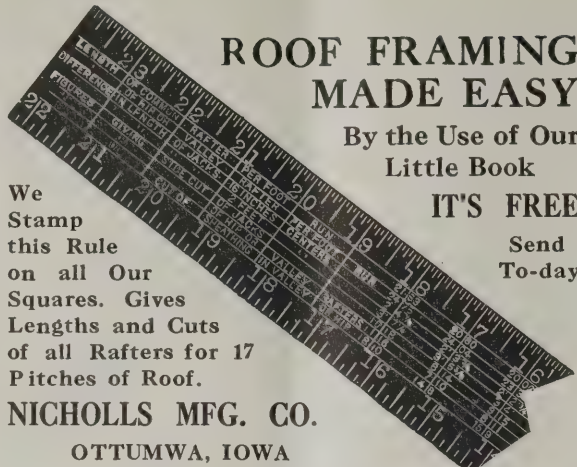
Bores any Arc of a Circle

Is guided by its circular rim instead of its center, and can be guided in any direction, regardless of grain or knots, leaving a true polished surface. Will bore a square hole. Unequalled for core boxes, delicate patterns, veneers, screen work, scalloping, newels, ribbon moulding and mortising.

THE PROGRESSIVE MFG. CO., Dept. A Torrington, Conn.



MACHINE BIT



**ROOF FRAMING
MADE EASY**

By the Use of Our
Little Book

IT'S FREE

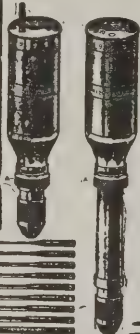
We
Stamp
this Rule
on all Our
Squares. Gives
Lengths and Cuts
of all Rafters for 17
Pitches of Roof.

NICHOLLS MFG. CO.
OTTUMWA, IOWA

Send
To-day

Experienced Mechanics
Familiar with boring tools
of all kinds, declare our

**Automatic Star
Pocket Borer No. 8**

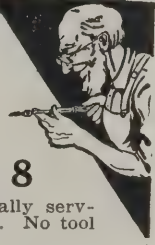


the most reliable and generally serviceable tool of its class made. No tool kit is complete without it.

Has magazine handle containing 8 bits 1/16" to 11/64" and a screwdriver bit; positive grip chuck; any bit can be released without disturbing others—can be compressed to handy size for carrying in the pocket. Made of steel, handsomely nickeled, with knurled handle.

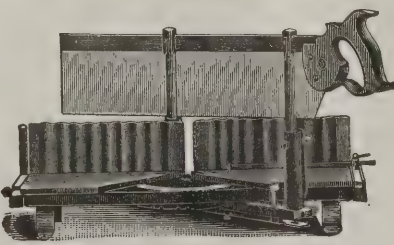
One of the handiest in our line.
Write for price and complete catalog.

MILLERS FALLS COMPANY
28 Warren St. New York



Goodell Mitre Box

Made of STEEL—Cannot Break
First in Quality and Improvements



Automatic Stops for holding up saw.

Corrugated Backs Graduated.

Gauge for Duplicate cuts and many other features.

If you want the best you will take no other.

Send for Circular K.

GOODELL MFG. Co., Greenfield, Mass.



White's Improved Level

before buying elsewhere.

This level is especially designed to meet the contractor's every need in the level line. Over 3000 giving perfect satisfaction. Shipped prepaid to your address on 5 days' approval. Write today for circular X, giving price and full information. **Written guarantee with each level.**

DAVID WHITE COMPANY
Dept. B
419 East Water St. Milwaukee, Wisc.

Investigate !!!



illustrations recently issued in circular form by the Northrup, Coburn & Dodge Co., 40 Cherry street., New York, where is shown a steel ceiling in the Hotel del Sr. Celestino Martinez, and another in the Club de Regatas, both located in the City of Cartagena, Spain. A new design in modern English Gothic style is also shown, in connection with which attention is called to the fact that with the Northrup, Coburn & Dodge method of uniting metal sheets, the joint is practically invisible.

Kahn System Standards

The fifth edition of the book entitled "Kahn System Standards" has been issued by the Trussed Concrete Steel Company, Detroit, Mich. The book deals with the underlying principles involved in the use of the Kahn reinforcing system. The stress in beams is first considered and the proper point for reinforcement discussed. The various products of this company are next considered and a set of specifications is given applicable to certain classes of reinforced concrete work. The next section is devoted to a more detailed consideration of the principle of reinforcing, and the end of the book is devoted to a series of useful tables. The price of the book is 50c.

TRADE NOTES

Hess Warming & Ventilating Company, 1201 Tacoma Building, Chicago, Ill., has just placed on the market a valuable adjunct of the culinary department of every well organized household in the shape of an electric dish washer. The claim is made that the device will wash the dishes of the family in two minutes with seven quarts of hot water. It also sterilizes and rinses them and they dry quickly without wiping. The cost is said to be only one cent a day for current. The company also makes the dish washer to operate by hand in case electricity is not available. A booklet which has been issued sets forth the merits of this labor-saving device.

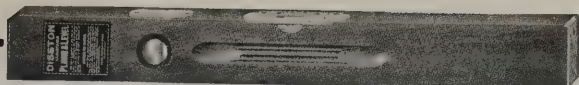
North Western Expanded Metal Company, 904 Old Colony Building, Chicago, Ill., is sending out a folder calling attention to the merits of solid plaster partitions constructed of plaster on Kno-Burn expanded metal lath supported by 3/4-in. channel studding. The great advantage of this method of constructing solid plaster partition 1 1/2 and 2 in. thick is the reduction of floor space occupied by the interior walls. The point is made that by using the solid metal lath and plaster partition there is added for every lineal foot of partition 1/3 of a square foot of available floor space and a corresponding increase in the rental return from the building. This folder accompanies the July number of the company's house organ entitled "Expanded Metal Construction" in which are to be found numerous illustrations of buildings in connection with which Kno-Burn Metal Lath has been used.

Wheeling Corrugating Company, Wheeling, W. Va., has been sending out attractive card calendars for the different months of the year, each card carrying a quotation with suitable illustration from some of the well-known poets. That for July illustrates Maud Muller leaning upon the handle of a rake and with the hay field serving as a background. The coloring is well executed and the calendar is an ornament for desk use. Incidentally, of course, reference is made to the sheet metal products of the Wheeling Corrugating Company and to the formed roofings, sidings and fittings which it is also prepared to furnish. Accompanying the calendar is a folder illustrating and describing some of the leading specialties of the company.

The Oak Flooring Bureau, 895 Hammond Building, Detroit, Mich., is distributing among its friends in the trade a celluloid paper cutter embellished with text and illustrations relating to oak flooring. The suggestion conveyed to the recipient of the paper cutter is that he "specify" the kind of flooring mentioned and refer to the company's catalogue for full information and particulars. One edge of the paper cutter is marked off into inches and 16ths of an inch while the statement is made by the Bureau that every bundle of oak flooring is marked to designate the grade and color and those supervising construction should see that the grade specified is stamped on every bundle that is received.

W. H. Barten, Gordon, Neb., has issued an interesting little pamphlet relating to the Barten Brick Machines and his process for making concrete building blocks and other artificial stone products, fence posts, etc. The brick machines are said to be operated in the same way as the block machines, no wooden pallet boards being needed.

(Continued on page 56)



DISSTON Plumb and Levels

Convenient to Handle
Easy to Adjust
Accurate and Durable

Particular attention is called to the corrugated grip. This gives a comfortable hold and a better purchase on the tool. The fingers take hold of the corrugations on one side, while the thumb fits naturally into one of the smooth sunken portions on the opposite side.

All progressive hardware dealers carry a full stock of Disston Saws, Tools and Files.



HENRY DISSTON & SONS

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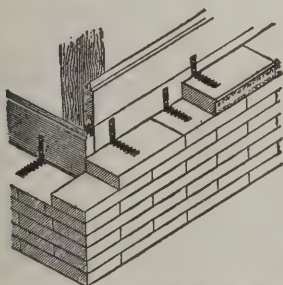
Keystone Saw, Tool, Steel and File Works
PHILADELPHIA, U. S. A.

BUILDING, ROOFING and INSULATING PAPER WOOD-WORKING GLUES

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C. B. HEWITT & BROS.

48 Beekman St., New York City



The Most Substantial

Walls are those built in which our **WHALEBONE WALL TIE** is used. Better than others' best.



Samples on request

ALLEGHENY STEEL BAND COMPANY
BELL PHONE: 718 Cedar North Side, PITTSBURGH

INTRODUCTORY TRIAL OFFER

If the SELF-SETTING PLANES are not sold in your town and you write us saying "I saw your trial offer in Building Age," we will send you particulars, a carpenter's pencil and our \$1.00 Certificate, which we will receive as \$1.00 in payment for a SELF-SETTING PLANE as stated in our \$1.00 Certificate, and if this S. S. Plane is unsatisfactory and returned to us at our expense, we will send you \$1.00 more than you sent us, as the \$1.00 Certificate says.

THE BEST IS THE CHEAPEST

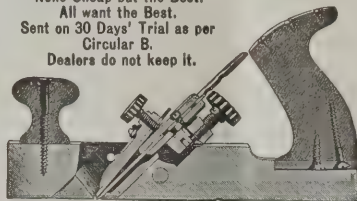
None Cheap but the Best.

All want the Best.

Sent on 30 Days' Trial as per

Circular B.

Dealers do not keep it.



O. K. ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WOODST cross-grained, early knurled, knotty, hard or soft wood you can find. THAT IS FREE FROM SAND OR DIRT. If it is not worth to YOU, OR YOUR MEN, TWICE ITS COST, return it at our expense as above stated.

If you send us the addresses of ten carpenters, no matter where they live, we will send you another hard, tough carpenter's pencil. Give the SELF-SETTING PLANE a chance to PROVE ITS WORTH. If it FAILS, return it and we will return your money. GAGE TOOL CO., Vineland, N. J.



ORDER THE "HYNALER" 75c

Best single claw hammer ever made. Holds the nail for high, low or far across driving. Grips plain part of nail so strongly as to pull the head of nail clear through the wood.



DOUBLE CLAW \$1 PARCELS POST

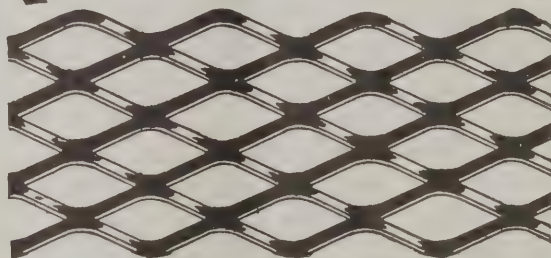
ORDER THE "DOUBLE CLAW" \$1

Best Hammer ever made. Holds the nail for starting to drive where you can not reach with two hands. Pulls the nail out straight without a block.

DOUBLE CLAW HAMMER CO.

453 BROADWAY, BROOKLYN, N. Y.

Berger's Metal Lath



The Berger Mfg. Co., Canton, Ohio

Write
for Catalog.

New York Minneapolis
Boston San Francisco
Philadelphia St. Louis



Make 300% Profit
Building Concrete
Cisterns with the
"Laughlin"
Collapsible and
Adjustable Forms

They are simple, strong and durable and can be adjusted to any size.

No tools required. No waste of material, as they last a lifetime.

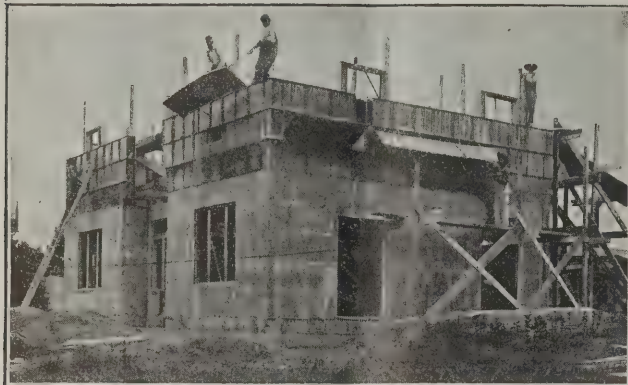
Write for prices and full particulars.

**LAUGHLIN
MANUFACTURING
COMPANY**

Dept. E DAYTON, O.

Steel Forms:

The Morrill System Solves the Problem



Pouring a house, the famous two tier swing-up process.

Reinforced concrete is the best and cheapest building material known today. The waste in wood forming has been the principal cost. The "Morrill" steel forms cut out this waste and material bills; can be used over a hundred times; adjustable to all dimensions for walls, foundations, columns, partitions and floors. All are of heavy pressed steel, wedge connections, automatically coming to line, locked and unlocked by the stroke of a hammer. Steel forms are a permanent investment, cutting out waste, better work, better finish, more speed and at less cost, for permanent structures; fire-proof, damp-proof, paint-proof, repair-proof.

A card today will bring catalogues of steel forms poured bungalows and houses. They will interest you and pay you to investigate.

READ & MORRILL CONCRETE FORMS CO.

179 Joralemon St.

BROOKLYN, N. Y.



Window frames removed to show continuous air space. We plaster direct to the inside wall, no lathing, and stucco direct to the outside wall.



Making ready to insert the floor beams.

Van Guilder Hollow Wall Concrete Machine— Continuous Air Chamber from Cellar to Roof

Steel Reinforced Throughout

DON'T WASTE YOUR MONEY

The labor employed for making building material, such as blocks, brick, tile, etc., we utilize to erect the building.

Completely revolutionizing building methods.

OUR WALLS ARE STRONGER

being double and monolithic from footing to roof plate, with a continuous air space everywhere between—a house within a house. The walls are tied together, also steel reinforced horizontally every 9" high.

**OUR BUILDINGS ARE WARMER IN
WINTER, COOLER IN SUMMER**

Damp proof, Frost proof, Fire proof, Vermin proof, No Maintenance, Everlasting, Cost Less, Sell Higher, Exterior finish up-to-date Italian Stucco

OUR SILO MACHINES

build the best silo walls in the world. Continuous air space. No freezing of ensilage. No vermin. New Special Machine for Cold Storage, 3 wall construction—2 continuous air chambers. No repairs. Stand forever.

Send for Illustrated Folder.

VAN GUILDER HOLLOW WALL COMPANY

712 CHAMBER OF COMMERCE BLDG., ROCHESTER, N. Y.

The Universal Portland Cement Company, 72 West Adams Street, Chicago, Ill., has been shipping daily seven cars of Universal Portland cement for use on the new Soo Terminal at Chicago. The entire work will require, it is said, approximately 100,000 barrels of Universal cement, which is used partly for footings and the floor of the first story but largely for the heavy slab construction of the second floor which forms the floor of the train shed. The concrete is mixed at three points and distributed from high towers but the distances are too great for chuting direct into the forms. The chutes therefore deposit the concrete in distributing hoppers which in turn fill two-wheeled concrete cars with which the entire area of the work is covered.

The Pullman A. V. M. Company, York, Pa., has recently secured among others, the contract for 114 special waterproof Pullman floor ventilators to be used as the intake system in the heating and ventilation of the Hippodrome Theater, Pottsville, Pa. The exhaust system will comprise the installation of regular Pullman ventilating cowls.

Sandusky Portland Cement Company, Sandusky, Ohio, has issued a late edition of its very interesting pamphlet relating to "Medusa" waterproofing. Much valuable information relative to waterproofing methods is contained within the covers of the little work, a copy of which can be obtained on application to the company.

The Portsmouth Engine Company, Portsmouth, Ohio, presents in another part of this issue an announcement relative to a flooring machine which cannot fail to interest builders generally.

E. W. Edwards, president of the Edwards Mfg. Company, Cincinnati, Ohio, is one of the principal incorporators of the Manufacturers Permanent Exhibition Company of Cincinnati. We understand that the company has leased the Burnet Hotel building and proposes to establish it for a permanent display of goods of all kinds manufactured in Cincinnati.

Methods of handling and using cement in large quantities, as illustrated in the case of the Chicago, Milwaukee & St. Paul Railway, are discussed in the July issue of the *Universal Bulletin*, published by the Universal Portland Cement Company, 72 West Adams street, Chicago. Numerous half-tone cuts are included, showing the loading of cement from the barrow to the car, dumping concrete into retaining wall foundations, dumping bulk cement into mixer hopper, and other operations.

A special type of door hanger is usually needed for garages, owing to the fact that, although a large door opening is necessary, the building itself is frequently so small as to provide little room in which the door may slide. This problem is satisfactorily solved by the use of a right angle door hanger, as illustrated in the June issue of *Door-ways*, published by the Richards-Wilcox Mfg. Co., Aurora, Ill., which permits the door to slide out of the way to a position at the side of the building.

The Stark Rolling Mill Company, Canton, Ohio, had an exhibit of Toncan metal at the recent convention of Sheet Metal Contractors in Washington, which attracted a great deal of attention. The feature was a stereopticon show of pictures of the plant and of places where Toncan metal is used and the purposes to which it is put.

The Yale & Towne Mfg. Company, 9 East 40th street, New York City, has purchased and will hereafter carry on the business formerly conducted by the Joseph Bardsley Mfg. Company, the business of which consisted in the manufacture and sale under the Bardsley patents of liquid door checks, liquid double-acting and single-acting checking floor hinges, screen door checks, wood knobs, etc.

The American Sheet & Tin Plate Company, Pittsburgh, Pa., distributed a souvenir to visitors to its exhibit at the recent Washington convention of Sheet Metal Contractors, consisting of a "clip" for holding papers which bore a list of the products made by the company.

The last issue of "Graphite" contains the usual quota of very interesting information relative to the products of the Joseph Dixon Crucible Company, Jersey City, N. J. The illustrations consist for the most part of half-tone engravings showing construction work in connection with which silica graphite paint has been used.

Laughlin Mfg. Company, Department E, Dayton, Ohio, calls attention of builders to the great advantages resulting in the construction of concrete cisterns from the use of the "Laughlin" Collapsible and Adjustable Forms. The statement is made that no tools are required in erecting the forms and that the work can be done with ordinary

(Continued on page 58)



Building Better for a bigger business

The quality of your work will reveal itself in the test of time. And you builders and carpenters who want to see your business grow and prosper should consider

UTILITY Wall Board

A tough, non-porous, moisture-proof fibre board material that makes a firm friend of every building owner. The convenient lengths and widths are easily and speedily put on by nailing directly to the studding. And it is sanitary, vermin-proof and never chips, checks or cracks. Then, too, it makes a smoother, more satisfactory wall for decorative purposes than plaster. And where the home owner desires to remodel only one or two rooms Utility Wall Board will save the heaviest expense of plaster and lath building—that of mixing the plaster—and will eliminate all the usual dust and muss and keep the furnishings free from lime and plaster droppings.

For YOUR own PROFIT
write TODAY for a SAMPLE
and the Book of Interiors

THE HEPPES CO.

Also manufacturers of Flex-A-Tile
Asphalt Shingles, Asphalt Paint
and Asphalt Roofing in any Finish.

4501 FILLMORE ST. CHICAGO, ILL.

MODERN AMERICAN HOMES.

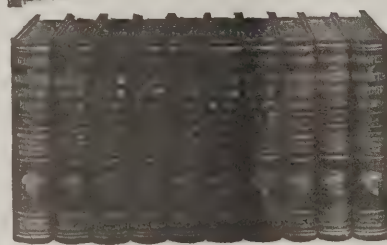
H. V. von Holst

NOW SENT FREE

Here is your chance to secure absolutely Free of Charge the most complete and up-to-date plan book ever published. No carpenter or contractor who wishes to be familiar with the latest in building construction—no man who is contemplating erecting a home—can afford to be without it. This great new plan book, "Modern American Homes," contains plans and specifications for 168 different structures, including excellent exterior and interior views, detailed estimates, etc. Designed by the leading architects of this country. Includes city, country and suburban homes, bungalows, farm houses, summer cottages, tent houses, camps, garages, apartment houses and various public buildings. 224 pages, 9½ x 12¾ inches, and 426 illustrations. Printed on heavily enameled paper and substantially bound.

THE CYCLOPEDIA OF

Architecture, Carpentry and Building



consists of ten massive volumes; 1,760 pages, 7x10 in.; 4,000 illustrations, full page plates, building plans, diagrams, etc.; hundreds of valuable tables and formulas; carefully cross-indexed for quick, easy reference.

This work covers everything in the building professions from the first rough sketch of the architect to the acceptance of the finished structure. It includes wood, stone, steel, and reinforced concrete construction; estimating and contracting; a study of the Greek and Roman Orders; interior finishing and decorating; and modern house lighting and sanitation.

Partial Table of Contents

Mechanical, Freehand, Perspective and Architectural Drawing, Lettering, Pen and Ink Rendering, The Orders, Superintendence, Strength of Materials, Masonry, Reinforced Concrete, Carpentry, Steel Square, Stair-Building, Hardware, Steel Construction, Roof Trusses, Practical Problems, Estimating, Contracts, Specifications, Building Law, Sanitation, Sheet Metal Work, Electric Wiring and Lighting.

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With every order for a Cyclopaedia we will include the Plan Book, absolutely free of charge and send you the Cyclopaedia and the Plan Book, express prepaid, for seven days' free examination. You keep the books a full week—examine them thoroughly at your leisure—and if they don't meet with your expectations they may be returned at our expense. Remember—the complete set, Cyclopaedia and Plan Book, are sent free upon receipt of the coupon below and we pay express charges both ways if they are not satisfactory.

Another Free Offer With each set is included a year's Consulting Membership, regular value \$12.00, entitling you to the free advice of a corps of Expert Architects. This will give practical help in handling your difficult building problems. This service alone is worth more than the first cost of the books.

American Technical Society, Chicago, U. S. A.

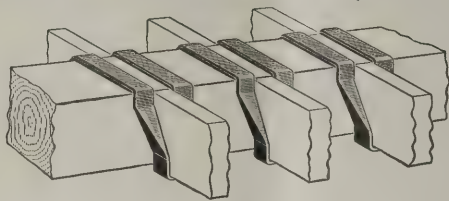
FREE PLAN BOOK COUPON

AMERICAN TECHNICAL SOCIETY, Chicago, U. S. A.

Please send Free Plan Book, also Cyclopaedia of Architecture, Carpentry and Building for seven days' examination. I will send \$2.00 within seven days and \$2.00 a month until I have paid \$24.80 for Cyclopaedia (Plan Book included free), or notify you and hold books subject to your order. Title not to pass until fully paid. Bldg. Age, 8-13.

NAME
ADDRESS
OCCUPATION
EMPLOYER

Lane Joist Hangers



are cheaper and better than mortise and tenon—saves labor—set the hangers and place the timbers in them and the job is done—forever. We will quote you direct. Have you a catalog?

LANE BROTHERS CO.

Livingston St., Poughkeepsie, N. Y.



SEE WHAT WE HAVE DONE FOR YOU!

Pages 10 to 16, 25 to 30 and 31-32 of our Pamphlet No. 29 are occupied by reliably compiled Tables that you will prize more and more as you realize that the figuring is all done and dependable.

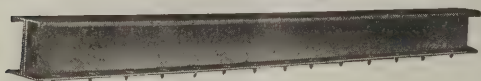
Much of this work is not to be found in print anywhere else.

If you haven't a copy of the pamphlet, let us mail you one; if you have one badly worn from frequent reference, let us replace it with a fresh one.

The W. J. Clark Co.

6th STREET
SALEM, OHIO, U. S. A.

Berger's Metal Lumber



I-Joists

Why not use Metal Lumber Instead of Wood Lumber? Write for Catalog

The Berger Mfg. Co., Canton, Ohio

For the best service address nearest branch.

New York
Boston

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Also manufacturers of Prong Lock Studs and Furring, Rib-Truss, Ferro-Lithic and Multiplex Reinforcing Plates, Metal Ceilings, Expanded Metal Lath, Sidewalk Forms, Raydiant Sidewalk Lights, etc.

Antiques of all Sorts

Send 4 cents for Catalog and Lists of Antiques—Rugs—Gifts. I ransack 1,000 attics annually. My stock is replete with fine Old Things from New England Homes.

HAND MADE RUGS

Braided, Woven, Drawn-hooked Rag Carpet Old Chintz, Patch Work.

RALPH WARREN BURNHAM
IPSWICH IN MASSACHUSETTS

labor. They are simple in construction, strong, durable and can be adjusted to any size.

Standard Mantel & Specialty Company, 406 West Depot Street, Knoxville, Tenn., has ready for distribution among interested contractors and builders Catalogue No. 17 showing a varied line of Standard mantels, grates and tiles. The company states that it sells only through its authorized agents and it desires to correspond with those who are engaged in the contracting business. The company has had 16 years' experience making and selling mantels of quality and what it has to offer cannot fail to command the earnest attention of the trade.

H. P. Didriksen, 120 West 11th Street, Anderson, Ind., is directing the attention of building contractors and others likely to be interested, to his adjustable floor scraper, which embodies many valuable features. It has adjustable handle, adjustable weight, adjustable blade head, adjustable blade, rubber tires and split axle. It is of such construction as to do its work quickly and economically, and the manufacturer states that if a trial does not convince the purchaser of these facts he does not want his money.

Automatic Sash Holder Mfg. Company, 46 Church Street, New York City, calls attention to the merits of the Automatic Sash Holders which it is furnishing. The holder consists of a small device with a ratchet wheel sunk in each side of the window sash or frame and pressing by means of two short spiral springs against the inside of the frame or sash. It can be readily adjusted to old or new windows, and is said to prevent windows from rattling, as it adjusts itself automatically.

COPPER CABLE SASH CHAIN

Thomas Morton
245 Centre Street
NEW YORK

Copper Cable
Steel Cable
Champion Metal
Steel Champion

SASH CHAINS
CHAINS

For Suspending Heavy Doors,
Gates, Etc.

All of SUPERIOR QUALITY

CHAMPION METAL SASH CHAIN

The Smith & Egge Mfg. Co.

BRIDGEPORT, CONN.

Sash Chains



Cable Chains



Jack Chains



Manufacturers of "GIANT METAL" Sash Chains

Manufacturers of "RED METAL" Sash Chains
Cable Chains, Jack Chains, Bell Hangers' Chains and
Plumbers' Chains. Made in Brass, Copper and Steel.

WRITE FOR CATALOGUES AND PRICES.

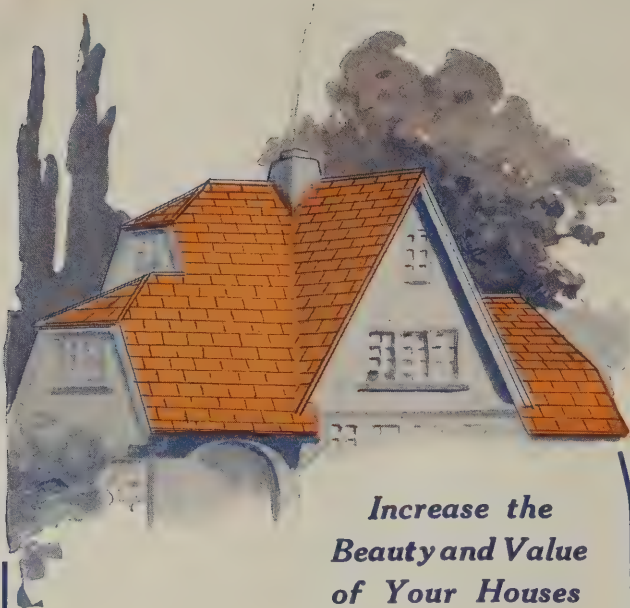
We are the ORIGINATORS of SASH CHAIN as
SUBSTITUTE for sash cord. In use over thirty
years. Capacity of our chain plant 30 miles per day.

❖ BUILDING AGE ❖



SEPTEMBER 1913

10 CENTS



*Increase the
Beauty and Value
of Your Houses*

by using

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THE BUILDING AGE

NEW YORK, SEPTEMBER, 1913

HOUSE IN A SUBURB OF COLUMBUS, OHIO

A Most Pleasing Effect Produced by an Exterior of Cypress, Stained Brown,
in Combination with a Roof of Red Stained Shingles

THE medium-cost dwelling of pleasing exterior and convenient arrangement which we illustrate herewith is located on Sixteenth avenue, which is in that beautiful extension to the City of Columbus, Ohio, known as the Indianola Forest Addition. The street

shingles and siding before being applied were treated with Cabot's creosote stain.

The concrete porch pillars are of granite sand and so constructed that the down spouts pass through the inside of the corner columns and do not mar the beauty



A House in One of the Suburbs of Columbus—J. A. Jones, Architect, 508 Dispatch Annex, Columbus, Ohio

upon which this attractive dwelling is situated conforms to the curves of an old watercourse, while the addition is heavily wooded with natural forest trees and the full beauty of these surroundings were considered by the architect when planning the home in question.

The outside frame of the house is covered with cypress resawed siding exposed 7 in. to the weather and stained brown. The shingles, both on the main roof and the roofs of the dormers, are stained red and laid with an exposure of 5 in. to the weather. Both the

and symmetry of them. The floor of the porch or veranda, which from an examination of the half-tone engraving presented upon this page will be seen to extend across the entire front of the house, is of tile laid in cement with wide joints, while the grade of the lawn is brought up on all sides to the level of the porch, or, more strictly speaking, the promenade, except on the side where the drive is located. At this point the "fill" is protected with a cobble wall.

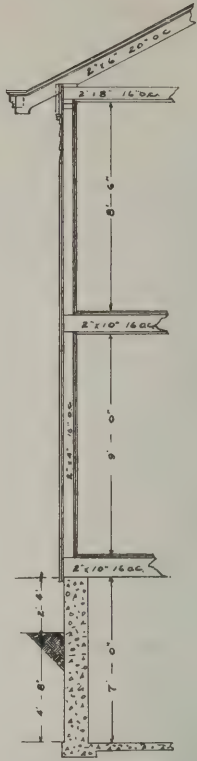
The peculiar dormer effect is the result of having removable flower boxes in front of the windows on



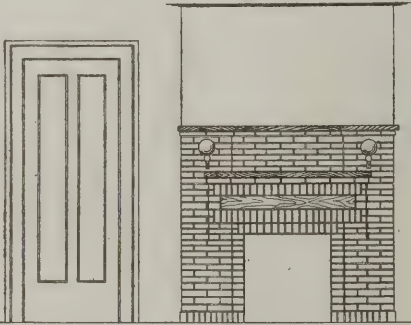
Front Elevation—Scale 3/32 In. to the Foot.



Side (Right) Elevation—Scale 3/32 in. to the Foot

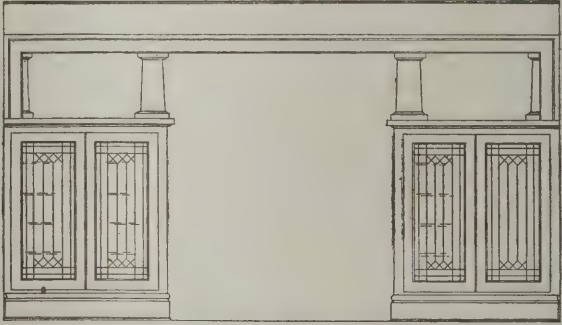


Section Through Rear Wall—Scale 1/8 In. to the Foot



•STYLE-OF-DOORS-

•FIREPLACE-IN-LIVING-ROOM-



•BOOKCASES-AND-CASED-OPENING-IN-LIVING-ROOM-



•WINDOWS-AND-CABINET-IN-RECEPTION-ROOM-



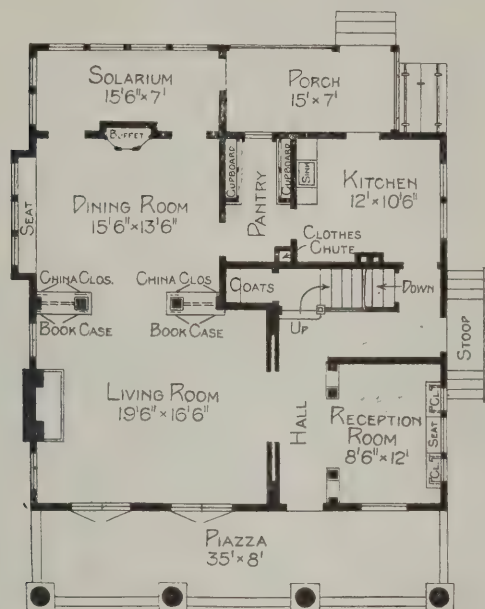
•CHINA-CUPBOARD-AND-DOORS-IN-DINING-ROOM-
•CONNECTING-WITH-DEN-IN-REAR-

brackets extending from the dormer beneath the window sills. At the time the picture shown on this page of the article was taken the boxes had not been filled.

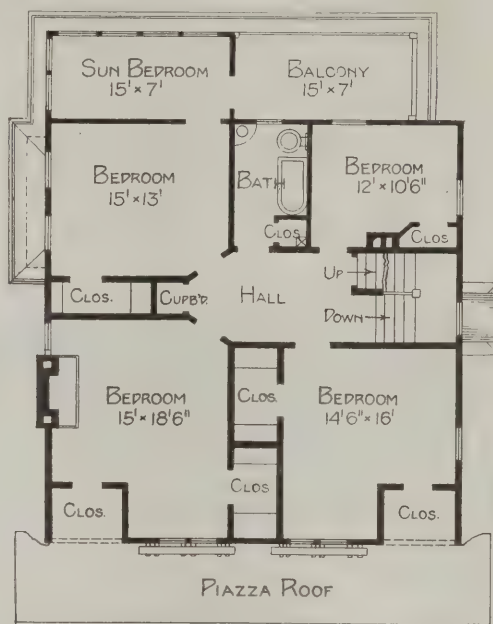
An examination of the plans shows upon the main floor a reception room at the right of the hall, beyond

cated in the second of the half-tone engravings presented herewith. In the third half-tone engraving another view of the living room is presented, looking into the dining room beyond.

Instead of a wall between the living room and the



First Floor Plan—Scale 1/16 In. to the Foot



Second Floor Plan—Scale 1/16 In. to the Foot



A House in One of the Suburbs of Columbus, Ohio—Living Room as Viewed from the Main Hall

which are the stairs leading to the second story as well as the flight by which the cellar is reached. There is direct communication between the kitchen and the front hall, thus avoiding passing through any of the other rooms in reaching the front door.

At the left of the main hall is the living room with its open fireplace and bookcases, all as clearly indi-

cated in the second of the half-tone engravings presented herewith. In the third half-tone engraving another view of the living room is presented, looking into the dining room beyond. Instead of a wall between the living room and the

In the dining room is a buffet built in such a manner as to jut out into the sun parlor at the rear only a few inches, thus making the most of the wall space and relieving the floor space of this much furniture. A window seat in the dining room provides a place for two large linen drawers with a wood grille for a down draft from the inside of the house to the furnace.

Double French doors open from each side of the buffet in the dining room into the solarium beyond, which is finished in white enamel and well lighted.

Communication between the dining room and kitchen is established through a commodious pantry fitted with cupboards and lighted by a window which gives out upon the rear porch.

On the second floor are four sleeping rooms each

tered sycamore, with the second floor which is finished in white casements with mahogany doors and mantels.

The floors of the rooms in the first story are $\frac{3}{8}$ x $1\frac{1}{4}$ -in. quarter-sawn white oak, while the floor in the second story are straight-sawn white oak, all being laid on a shiplap sub-flooring. The floors of the rooms in the first and second stories are finished with Pratt & Lambert's filler and two coats of their No. 61 floor varnish, polished.

The bathroom is equipped with fixtures made by the Standard Sanitary Mfg. Company, Pittsburgh, Pa.

The house is heated by means of a hot-air furnace made by the Patric Furnace Company, Springfield, Ohio. The furnace is known as a No. 621 and has a patent coking device with two down drafts—one from



A House in One of the Suburbs of Columbus—View in Living Room Looking Toward the Dining Room and Showing Book Cases at the Opening Between the Two Rooms

with a commodious clothes closet, a bathroom and a sun bedroom, the latter being located directly over the sun parlor or solarium of the first floor.

The entrance to the house is into a hall finished in quartered sycamore, mahoganized. A spacious effect is given to the interior by opening the hall into a small French reception room with paneled buttresses similar to those used between the living room and dining room excepting that they are not supplied with cases. It should be stated, however, that ornamental cases are built in this room underneath a large window with a seat at the bottom and with casement windows at the top of each case.

The stairway in the main hall is constructed of quartered sycamore with white spindles and white risers, thus connecting the hall, which is entirely of quar-

tered sycamore, with the second floor which is finished in white casements with mahogany doors and mantels.

The house here illustrated and described is that of Stuart R. Bolin, 99 Sixteenth avenue, Columbus, Ohio, and was erected from plans prepared by Architect J. A. Jones, 508 and 509 Dispatch Annex, Columbus. The general contractor for the work was B. F. Bolin, 1993 Indianola Avenue, Columbus, Ohio.

The house is most pleasing in its general aspect and the architect states that under ordinary labor conditions and market for materials can be completed for about \$6,000. An examination of the half-tone engraving on the first page of the article shows just beyond the waiting automobile the garage of Mr. Bolin. This also is of cypress trimmed in white to correspond with the treatment of the house.

SCALE OF WAGES IN THE BUILDING TRADES

Some Interesting Comparisons of Figures in Three Groups of Cities in the United States as Revised to July 1, 1913

IT is always a source of much interest for those associated with the building industry to note how wages of mechanics in the various branches differ in one section of the country from those which obtain in places more or less remote thereto; as, for example, how the rates in leading centers on the Atlantic seaboard compare with wages received by the men in some of the principal cities on the Pacific Coast. In the table pre-

In addition to the information given in the table it may be stated that in Boston plasterers laborers receive 41½ cents per hour and metal roofers 55 cents. In Cincinnati laborers work nine hours per day beginning October 1, 1913. In Los Angeles plasterers laborers receive 50 cents per hour. At the time the chart was compiled carpenters and sheet metal workers had asked for an increase

Rates of Wages, Per Hour, Paid in Various Branches of the Building Trades

Name of City	Masons and Bricklayers	Structural Iron Setters	Plasterers	Lathers	Plumbers	Steam Fitters	Carpenter	Painters	Sheet Metal Workers	Electrical Workers	Roofers	Cement Finishers	Laborers and Hcd Carriers
Boston.....	65	56½	65	\$2.75-\$3M 60c hr.	62½	50	55	50	45-55	37½ to 56½	Comp. 28-43½ Slate 55	62½	L. 25 H.C. 30-40
Hartford.....	65	50	65	50	55	54	50	45	45	40	45	54	L. 25 H.C. 37½
Newark.....	65	56½ to 62½	65	50	62½	56½ to 60	50	47½	60	56½	Slate 60 Comp. 40	60 to 65	L. 25 to 30 H. C. 35
Philadelphia.....	M. 55 B.L. 62½	60	62½	Wood \$2.50M Metal 56½	43½	43½	50	40	45	40	45	45	37½
Washington.....	66 2-3	50	62½	\$2.25 per M	50	50	50	50	50	55	50	45	L. 18½ H.C. 28½
Atlanta.....	45	62½	45	30	50	45	30	30	40	40	35	45	15
Jacksonville.....	B.L. 62½	43½ to 50	56½ to 62½	37½	56½	56½	34½-37½	34½-37½	37½	45 to 50	37½	.....	L. \$1.50 H.C. \$1.50-\$1.75
St. Paul.....	M. 55 B.L. 65	50	62½	Wood 4 a yd. Metal 55	62½	56½	40 to 50	50	40	30 to 47	Grav. 30-35 Slate 40-45	50	L. 22½ H.C. 30 to 35
Chicago.....	75	68	75	71½	75	75	65	65	65	75	65	65	40
Cincinnati.....	M. 60 B.L. 70	62½	68½	...	62½	52½	50	50	40 to 45	50 to 55	40 to 45	50	L. 25 H.C. 25 to 32
St. Louis.....	M. 70 B.L. 75	65	75	68½	66½	75	62½	57½	60	65	55	60	L. 20 to 37½ Brick 47½, Mor. 50
Memphis.....	M. 65 B.L. 75	62½	75	Wood 50 Metal 62½	62½	62½	50	50	50-60	45	50-60	62½	L. 17½ H.C. 30
New Orleans.....	62½	50	50	50	56½	56½	35 to 45	37½	35 to 45	\$3.60 a day	30	45	L. 15 H.C. 30
Denver.....	M. 62½ B.L. 75	56½	75	50 to 56½	62½	62½	60	50	56½	37½ to 50	37½	68½	L. 37½ to 40 H.C. 37½ to 43½
Salt Lake City.....	M. 62½ B.L. 75	62½	75	62½	75	75	62½	62½	57½	56½	50	62½	L. 31½ H.C. 50
Seattle.....	75	62½	75	62½	68½	68½	...	56½	56½	62½	50	62½	L. \$2 to \$3.50 H.C. \$4.00
Portland, Ore.....	M. 70 B.L. 75	75	75	62½	75	75	\$4.00 a day	50	\$4.50 a day	50-62½	37½	\$5 to \$6	L. \$2.50-\$3 H.C. 50
San Francisco.....	\$7 a day	62½	87½	75	75	75	62½	56½	68½	62½	75	75	L. 31½ Brick 50 Plas. 62½
Los Angeles.....	M. \$5.50 a day B.L. 75	38 8-9	75	\$2.25 per M	56½	56½	50	43½	50	43½	43½	62½	L. 34½ H.C. 37½
San Antonio, Texas..	B.L. 87½	62½	75	...	56½	...	45	45	...	56½	...	...	L. 21½ to 25

sented herewith the country is roughly divided into three zones and a few of the leading cities selected from each. The figures are taken from the official schedule of 65 cities in the United States and Canada compiled by E. M. Craig, secretary of the Builders' Association, 808 Chamber of Commerce Building, Chicago, Ill., and corrected up to July 1, 1913. It will be seen that most of the trades operate under an hourly scale, but some are paid a stated sum per day. A comparison of the figures presented with those published a year ago will readily show the changes if any which have occurred in any particular city of the country covered by the schedule.

of 50 cents a day in wages and electricians nine hours. In St. Paul hoisting engineers, elevator constructors, roofers and laborers work ten hours per day.

A new association of architects has recently been formed in the state of Montana. It is interested in the licensing of architects in that state and efforts are being made to secure the passage of a bill to this end.

The painters of Madrid, Spain, are among the few favored trades enjoying the eight-hour day.

SOMETHING ABOUT THATCH ROOFS FOR HOUSES

What an English Writer Has to Say About This Early Scotch Method of Covering the Roofs of Houses

BY JOHN Y. DUNLOP

IT is well known that thatch in Scotland goes back to a very ancient date and is one of the earliest known methods of covering a roof. The use of straw rushes and heath was no doubt brought about by the small cost and the saving in expense in bringing other material from a distance. This material, if securely fixed, forms a very good roof and is not affected to any great extent by change of temperature. Consequently the covering gives warmth in winter and renders the building cooler in summer.

The material generally used in Scotland is heather and straw laid in several thicknesses to a depth of 12 in. In the Highlands these heather-thatch roofs are still to be seen, but the more recent style of cottage inhabited by the well-to-do Crofters, if Crofters can be said to be well-to-do, are covered with straw thatch.

tection against the elements when in that state.

In some districts the heather-thatch is anchored in position by a network of ropes placed on top of the roof covering and to which stones are tied quite close to the eaves.

For straw-thatch the material should be wheat or rye straw, as much as possible unbroken, and should not have been through a threshing machine. It is best cut a little before fully ripe.

Rye straw is toughest and best; wheat straw follows next in order, but barley and oat straw are inferior, being short and not of much use. In all cases the produce of a good and fairly dry summer gives the best results, and it should be free from mildew or mold as it lasts much longer if not diseased.

The thickness of the roof covering should be from



Something About Thatch Roofs for Houses—An Example of a Thatched Dormer Roof Where the Verge Is Carried on an Oversailing Course Formed on the Gable

In this class of roofing, the covering being light, much smaller scantlings in the way of rafters and roof timbers can be adopted and it is no unusual sight in some districts to see roof couples built of timber which has been felled, the branches lopped off and set in position. The laths to which the thatch is fixed are also home product, in which the butt ends have been roughly trimmed, or they may be split timbers taken from a larger trunk. Very picturesque effects are obtained by using heather as a roof covering, but it must be borne in mind that this material is not equal to straw thatch and where it has been used successfully the best results have been secured by having an under layer of straw, then finishing with a layer of heather on top.

The reason for this is that after a year or two exposure the heather wears to the fiber and is little pro-

tection against the elements when in that state. 12 to 16 in. and it should in all cases be dampened before the operation of drawing in order that it may pack tightly. Subsequent coats need not be more than 4 or 6 in., but all hollow places should be built up level.

The life of wheat straw thatch is about 15 to 20 years and of good oat straw from 8 to 9 years. After these periods fresh coats of straw are required from time to time for the renewal of the surface.

In thatching the straw is made up in bundles and as the bundles are handed up by the assistant they are fixed by means of the forks being thrust tightly down through the thatch below the top binder and over the poles and there secured by the under-thatcher. The butt end of each layer of straw covers the head of and overlaps the hazel rod ties of the next layer below and should alone show on the face.

Where twine is used the same method is followed,

but the bundles are secured by passing the needle down through the thatch, the under-thatcher returning the twine around the poles or laths and passing the needle upward to the outside thatches.

After the roof is covered the whole surface is carefully raked down until all the loose and twisted straw is removed and the surface presents a smooth and unbroken appearance. The longitudinal ties are then secured and finally the ends, eaves and gables are trimmed with shears.

In all the recent examples of this work the thatch is secured with stout hemp twine, but for the very best work light copper wire can be employed to advantage.

The eaves are always carried well over the face of the wall and cut on the skew at right angles to the vertical so that the rain water is thrown clear of the wall. This is one of the disadvantages of thatch — that it does not lend itself to the fixing of a simple gutter.

A gutter may be executed of an unequal V-shaped trough, the short arm be-

oversailing course of brick or slate should be formed immediately over the upper surface of the top layer and the thatching should be curved upward and pruned hard up to the vertical face of the stack.

The ridges are always formed separately and are laid on over the ordinary thatch with as long staples as the material will allow and are secured to the ridge pole in the ordinary way.

A great deal of the charm of our countryside is due to the use of this material for houses and cottages, and yet from a variety of causes the craft of the thatcher is on the wane and there is no doubt that a future generation will count thatching among the lost arts.



A Dwelling Covered with Thatch Roof Having a Straw Ridge

The Bureau of Standards of the United States Department of Commerce has been conducting a series of tests for the purpose of determining the suitability and permanence of cement in structures exposed to chemical and mechanical action of sea water. One of the conclusions is that properly made Portland cement concrete when



A Few Examples of Early Thatch-Roofed Cottages



A Porch Having Thatch as Its Roof Covering

Something About Thatch Roofs for Houses

ing on the inside and the longer placed to catch the drip from the straw. This addition does not improve the appearance of a thatch roof, which is best left with the face neatly trimmed.

The verge of the roof should also project. In the half-tone illustration showing a thatched dormer roof the verge is carried on an oversailing course formed on the gable. In forming a valley in this work extra thicknesses of straw are used, the finishing coat being secured, as already described. In the best work the valleys are formed with tile on to which the thatch laps and is neatly trimmed.

When the thatching butts against a chimney an

totally immersed is apparently not subject to decomposition by the chemical action of sea water. An interesting description of a series of tests and a summary of conclusions is contained in Technological Papers No. 12 of the Bureau of Standards, Department of Commerce, Washington, D. C.

The new \$100,000 country house to be erected at Jericho, Long Island, N. Y., for Mrs. William K. Vanderbilt, Jr., was planned by J. Russell Pope, 527 Fifth Avenue, and the contract has been awarded to John R. Hill, of Westbury, Long Island.

INTERIOR DECORATIONS FOR COVER DESIGN

Suggested Color Schemes for the Various Rooms with Hints Regarding Furniture, Floor Covering and Wall Treatment

BY ANNA L. MOFFATT



IN considering the interior decoration of the various rooms as embodied in the dwelling represented by the cover design of the July issue of the paper, the architect has obtained a spaciousness not usual in such a comparatively small house. The arrangement of the first floor will allow of much independence in furnishing, although I think it well to consider the wall covering in its relation to adjoining rooms.

The living room with the entrance opening into it would suggest a home-like livable treatment. Here as in the dining room and study the woodwork is oak finished in a soft brown, and the floors are finished in the same color not too highly polished. The paper in this room may be a soft green with chintz figure in self-tone. At the windows there may be scrim casement curtains edged with narrow lace, hung in panel effect slightly full on the rod. The over-draperies should be of sunfast material made of Flemish valance. On the floor space may be laid several medium-sized rugs of a durable quality, preferably Shiraz, Kabistan or Saraban. In the fireplace Dutch colonial andirons will complete the effect of the attractive mantel, which is also of Dutch design.

The Furniture

The furniture may consist of upholstered pieces done in tapestry showing tones of green, rose and brown. The lamp shades should also be in these colors and with the rugs make just the right contrast for a room at once livable and refined.

The study is most successfully done in tones of brown, the walls covered with a dull brown ingrain paper. A rug in two tones of brown should cover the floor space. At the windows should be scrim curtains the same as in the living room. The glass door may also be curtained in scrim, using two rods. The over-hangings may be of brown cotton rajah. The contrast here is derived from the books and the lamp shade, which is in tones of lavender and rose.

The Dining Room

Now as regards the dining room the decorator should aim for a cheerful effect. The wall covering should be a background rather than decorative. I would suggest for this room a buff paper with a rug showing tan, rose and quite a little old blue. At the windows we would hang old blue sunfast material as this allows the light to show through harmonizing beautifully with the wall. Oak or mahogany will look equally well here and white woodwork could be substituted for oak if desired.

Probably nothing assists so much the dainty treatment of a bedroom as white woodwork. The second floor is finished in white, the last coat being of flat enamel. In the hall there can be green cartridge paper of quite a light shade, as this tends to a spacious effect.

In the master's bedroom, which we have papered in ivory, there are a few good pieces of old mahogany. There are muslin curtains drawn back and for over-

hangings I would suggest a reproduction of one of the old chintz patterns. I have in mind one that sells for 29 cents a yard that would be charming in this room and with a rag rug the effect would be most delightful.

For the guest's room I would suggest a gray wall paper with a lace-like surface, each panel space having a border of lavender and green. The draperies should match the border in design and colors. I would place here a green rug and with curly maple furniture we will have at small cost a handsome room.

The Daughter's Room

The walls of the small room I would cover with chintz paper having small bouquets of pink and blue flowers. A pink cretone rug and pink cotton taffeta for window drapery and cushions will not be out of place. The furniture I would have of white enamel with one white willow chair and cushions in pink. This would make an ideal room for the daughter of the house.

A New Fireproof Hotel

A new 300-room fireproof hotel which will be known as the Chateau Rochambeau is about being erected at Hartsdale Park, Hartsdale, Westchester County, N. Y., to cost with its site and furnishings in the neighborhood of one million dollars. In its arrangement the hotel will be divided substantially into three divisions—for transient, permanent and club residents. The lower stories, portico and terraces are to be built of stone, while the upper walls will be covered with rough stucco of a light ivory color. The roofs and pinnacles of the *porte-cocheres* will be covered with green Spanish tiles and the general color scheme combined with the varying masses and heights of the building together with the admirable location will create a most picturesque effect.

Special attention will be given to the laying out of the grounds which will be designed after the famous Andalusian Gardens in Spain. The walks will be of brick in various colors, laid to a design, and at various points along the walks pergolas will be built containing settees built of Moorish tiles.

The hotel will be fireproof and situated on one of the highest positions of Westchester County. It is to be built in the style of the French Renaissance from designs of William H. Gompert, architect, and is to be the embodiment in design of several famous chateaux in France. It will be erected for Thomas Healey, of New York City.

Staining Fir

A writer in one of the English papers says that a good stain for fir is made by using one-third oil, one-third benzine and one-third benzol with enough driers and the proper amount of oil colors to get the shade wanted. The stain will penetrate the wood so well that it has the appearance of a water stain with the advantage that no sandpapering is needed.

Give the stain one coat of shellac and one coat of varnish, full body, and the result will be a job as good as most work receiving two coats of varnish.

MAKING A SLOPE ON A CONCRETE ROOF

How Coal Cinders May Be Used to Advantage—Weight of Cinder Concrete—A Good Form of Construction

By ERNEST McCULLOUGH, C.E.



SINCE the general introduction of reinforced concrete slab roofs and flat arch construction the problem of obtaining a slope for the top surface has been met pretty generally in one way, namely, piling cinders on the roof slab and covering the cinders with tar and gravel, or some form of patented roofing.

The roof slab is sometimes placed on a slope and a ceiling suspended from it, but the possibility that some day an additional story may be wanted leads num-

bers of owners and architects to dispense with the suspended ceiling and thus they can utilize the slab as a floor eventually.

In some sections of the country the cinders are good and the coal from which the cinders come is comparatively free from sulphur. The use of cinders as a "fill" on roof slabs in such sections is not followed by disaster.

In many sections of the country, notably some of the Middle West States, there is more sulphur in the coal

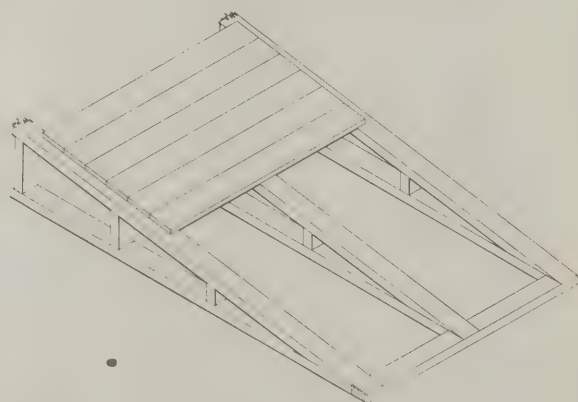
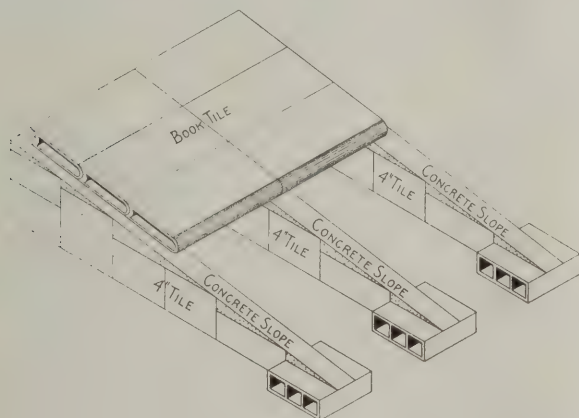
A number of instances have come under the observation of the writer and he has found several men who have known instances, yet it is surprising how few architects seem to know about it. If they all knew that it is a very doubtful, and maybe dangerous, thing to form a roof slope by using cinders, they would undoubtedly stop following such a practice.

It is customary to design roof slabs for a live load of 25 lb. per sq. ft. The writer examined lately a roof slab for which the following assumptions had been made:

	Lbs. per sq. ft.
Weight of slab.....	60
Plastering	5
Tar and gravel roof.....	15
Live load.....	25
Total load.....	105

The designer, it will be noticed, had made no provision for cinders, or any other method, for obtaining a slope on the roof. On the edge next to the parapet wall the cinders were thirty-one inches deep and at the middle of the building they were six inches deep. The average depth, therefore, was practically 18 inches.

The specific gravity of soft coal cinders is said to be 1.5 and the voids are frequently as high as 60%, so the weight of one cubic foot of cinders as ordinarily



Making a Slope on a Concrete Roof—Illustrating Two Methods of Construction

and methods of burning are not all they should be, so the cinders contain a great deal of unconsumed coal. The sulphur and unconsumed coal act alike when wet and confined beneath a water-tight blanket consisting of several thicknesses of pitch-impregnated felt, sealed with pitch and covered with gravel. The cinders expand. The heat of the sun on the roofing seems to have a bad effect also, possibly by causing the generation of gas.

The almost invariable result is that the expansion of the cinders forces the parapet walls out and cracks appear in the ceiling of the top story, next the walls. Occasionally the walls are thick and the surface of the roof undergoes strange changes, caused by the expansion acting along the line of least resistance.

[NOTE.—The remarks of the author in regard to the weight of cinder concrete seem to be borne out on tests made at the Government Materials Testing Laboratories and given in Technologic Paper No. 2, Bureau of Standards. In making tests of concrete beams a number were made with cinders as the aggregate. The cinders were screened through a 1-in. mesh, and 78 per cent retained on a ¼-inch mesh. The concrete was composed of 1 part cement, 2 parts sand and 4 parts cinders. The cinder concrete thus made weighed 118 lbs. per cu. ft.—EDITOR.]

piled is about 37.5 lbs. In placing cinders on a roof slab they are thoroughly wet and then tamped when deposited in place. Assuming that the tamping reduces the voids one-half, the weight of one cubic foot of cinders is increased to 60 lbs. and if one-half the remaining voids are filled with moisture—this being a fair assumption—the weight of one cubic foot of wet tamped cinders cannot be less than about 75 lbs.

The above assumptions may be taken as correct, for the writer has tested the matter and found the weight of one cubic foot of wet tamped cinders, compacted as the specifications of architects generally require, to vary between 75 lbs. and 88 lbs.—never less than 75 lbs. This being the case, the slab covered with 18 ins. average depth of cinders is loaded with 113 lbs. per sq. ft. that was entirely neglected in the design. It is an easy matter to say, as the writer heard one architect remark: "Oh, fill the thing with cinders; they're light."

Another idea that many men have is that cinder concrete weighs about 90 lbs. per cu. ft., and designs

are often made on that assumption. The writer has weighed hundreds of samples and has so far failed to obtain a cubic foot of cinder concrete that weighed less than 103 lbs. and has found many samples weighing as much as 115 lbs. per cu. ft. Cinder fill as usually placed between sleepers on floors is assumed to weigh 40 lbs. per cu. ft., and in reality weighs nearer 90 lbs.

The foregoing facts and calculations for weight of cinder filling show that roof slabs must be designed to carry a heavier load than floor slabs, if a cinder fill is to be used. The parapet walls must also be thick and the slab must be tied to the brick walls very securely to guard against possible destruction in case the cinders swell, as swell they will in the majority of cases.

Some architects who are afraid of overloading the roof slab use wooden frames spaced from 2 to 4 ft. apart and over them place a decking of wood, on which is placed the composition roof. The danger of fire and the certainty of decay are arguments against such construction. Insurance men oppose it.

The writer has recommended the following to architects and believes it to be a desirable construction: Lines of 4-in. tile are placed across the roof 2 ft. apart on centers. Four-inch tile, for example, comes in the following sizes:

$$\begin{array}{l} 4'' \times 6'' \times 12'' \\ 4'' \times 8'' \times 12'' \\ 4'' \times 12'' \times 12'' \end{array}$$

and the weight is approximately 15 lbs. per sq. ft. 4 ins. thick. The tile are placed on side or edge, as may be most advantageous, so the wall is only 4 ins. thick. Steps are formed which are filled with cement mortar and the tile are laid in cement mortar. On top of these walls 3-in. book tile 24 ins. long is laid, this weighing about 15 lbs. per sq. ft. The walls may be made of some form of gypsum block, which will reduce the wall weight practically one-third.

Average Weight Per Square Foot

Taking the example just given for the cinder fill, the average weight of the wall of tile, with the cement mortar, will be about 24 lbs. per lineal foot, or, as the walls are 2 ft. apart, 12 lbs. per sq. ft. Add the weight of the book tile and the total average weight per sq. ft. of the structure upon which the composition roof is placed will be about 27 lbs. to 29 lbs. per sq. ft. The weight of this construction must be taken into account when the roof slab is designed, instead of neglecting it, as is so common these days. The weight, on an average, for the cinders we found to be 113 lbs. per sq. ft., with no provision made for any load from this construction.

Several Middle West architects have been injured in reputation by the swelling of cinder fill, because they evidently had never heard of the swelling of cinders when thus confined, and quite a number of buildings have been seriously damaged by the load of from 75 lbs. to more than 100 lbs. per sq. ft. imposed on them when they were designed for a live load of only 25 lbs. per sq. ft. Suppose the roof first mentioned was designed for a total load of 105 lbs. per sq. ft. with a fiber stress in the steel of 18,000 lbs. per sq. in. and a fibre stress in the concrete of 800 lbs. per sq. ft. Then put on it a constant load of 113 lbs. per sq. ft. It will be carrying at all times a load of 193 lbs. per sq. ft., the full live load of 25 lbs. perhaps seldom if ever being imposed, but if it is the load, of course, is increased to 218 lbs. per sq. ft. This will stress the steel beyond the elastic limit and keep the concrete always stressed up close to the maximum 30-day strength. It is very unsafe practice and should be condemned.

Six Months' Building Operations in Canada

The growing tendency to conservatism in various branches of the building industry is, according to recent statistics, being manifested in Canada as well as on this side of the line. Taking the figures for many of the leading cities of the Dominion it is found that in the first six months of the current year building operations in Canada were about 8 per cent. less than for the first six months of last year. It must be remembered, however, that 1912 was a year of somewhat unusual activity in the building line in Canada and when the totals for the first half of this year are considered entirely apart from any comparison they indicate a building expansion that must be regarded as highly gratifying.

The *Contract Record* shows that in 32 cities permits were issued during the first half of the current year calling for an estimated outlay of \$79,787,919, whereas in the first six months of last year the total was \$87,353,151. In the amount of permits issued Toronto heads the list with a total of \$13,734,410 as against \$13,195,271 in the first half of last year. Montreal is second in order as regards the estimated cost of the building improvements for which permits were taken out with an increase of 23 per cent. over last year. The third city on the list is Winnipeg, with \$9,531,400 as compared with \$11,487,150 in the first half of 1912. Vancouver is next with \$7,118,253 for the first half of this year as against \$8,132,720 in the corresponding period a year ago. Edmonton is fifth with a total for the first six months of \$6,345,490 as contrasted with 7,538,862 in the first half of 1912. Calgary, which is sixth in order, shows a falling off of 48 per cent.; Victoria, 41 per cent., and Moose Jaw, 24 per cent.

The authority in question points out that the decline this year in building operations is due to the money stringency, but the hope is expressed that before the season is over a marked recovery will be noted and that there is to be no general permanent depression in the building trades of Canada.

A Brick House Built 123 Years Ago

We understand that the brick house erected by George Washington at Glasgow, Barren County, Ky., in 1790, is still being used as a habitation. When the house was first erected Glasgow was in Fairfax County, Va., the house being put up as a residence for General Spottiswoode, a cousin of George Washington, and who was governor of Virginia at that time. The architecture of the house is a wonderful combination of the frontiersman's cabin and the city type of dwelling. The walls are of brick 36 in. thick, the floors are of hardwood 2 in. thick, made of chestnut and laid with dowel pins, and the original roof was hand-cut chestnut shingles ½ in. thick and fastened with wooden pegs. In fact there is said to be not a single nail in the entire structure, for nails were not manufactured at that time.

The windows are of glass brought over from France. With the exception of the kitchen, which has been re-roofed, and some repairs on the main roof, the house has not been remodeled during the 123 years of its existence. The wear and tear to which a building is subjected in the course of the years is clearly shown in this house, for the glass is worn so thin that many of the panes are said to be no thicker than an ordinary piece of tissue paper.

A movement has been started in Circleville, Ohio, and a neighboring city for the preservation of the "Logan Elm," made famous by the speech of Logan, the Indian chief, in 1774.

SCHOOL HOUSE MODELS SENT BY PARCEL POST

A Novel Method of Developing Interest in Low Cost School Houses for the Rural Districts—Buildings Designed by Bureau of Education

SENDING cardboard models of school houses by parcel post is the latest device of the United States Bureau of Education for arousing interest in attractive school buildings at low cost for rural communities. The models are made to fold flat and are shipped by mail to local authorities, normal schools and other agencies for use during a limited period. A number have already been sent to points in the West.

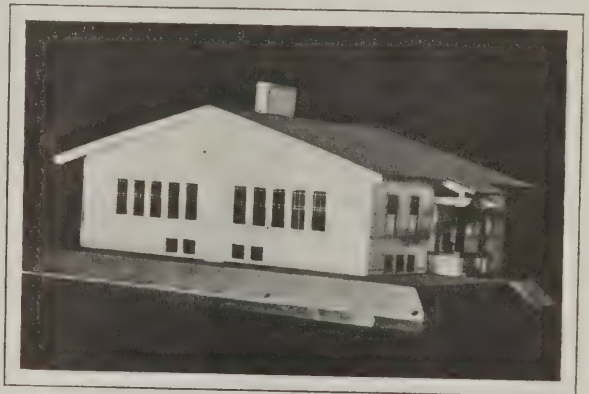
Models for one, two, three and four-room schools are provided, the example here illustrated being for the three-room building. The structures are planned

date in every particular. With one of these models to work from Dr. Dresslar asserts, any carpenter will be able to build a school house for his district that will meet every modern requirement.

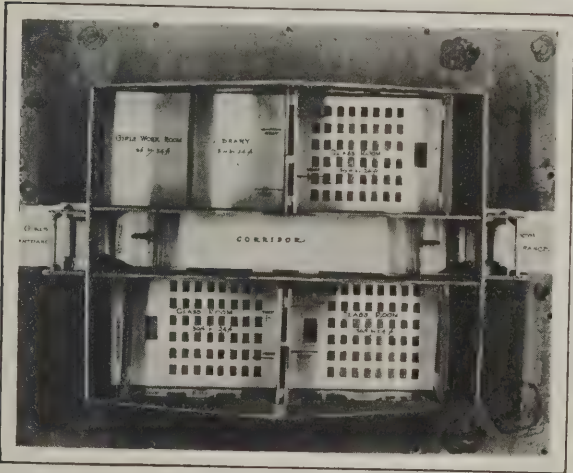
Contractors in the city of London must be careful what becomes of the dust incidental to the operation of demolishing a building else they are liable to legal action. In a recent case concluded in the Chancery Division, where a woman brought an action against a



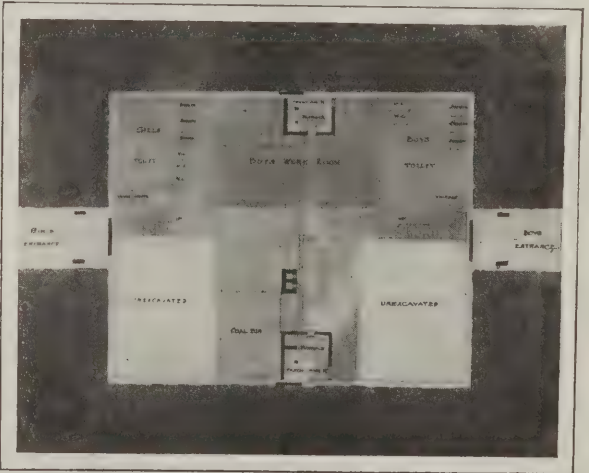
Front Elevation of the Building



Perspective View, Showing the Many Windows in the End or Side of the Building



Plan View of one of the Buildings as Viewed from Above and with the Roof Removed



Plan of the Basement Showing Work Room, Toilets, etc.

School House Models Sent by Parcel Post

especially for rural communities where low cost is the first essential. They embody good features of recent practice in school architecture, are attractive in design, and are planned with reference to hygienic arrangement, yet are within the means of the smallest community.

The buildings were designed by Dr. F. B. Dresslar, of the Bureau of Education. The models show all the details within and without, and they are constructed to scale. Full directions accompany each model.

It is believed that these models will be of great assistance to school authorities in small rural communities that cannot afford to engage a school architect, yet are ambitious to have their school house up to

firm of builders for alleged nuisance through dust created during the demolition of an adjoining house, the justice found that during the demolition the defendants had not exercised reasonable care and skill to protect the plaintiff's house from dust and awarded her \$200 damages.

A feature of the new 25-story McAlpin Hotel at Thirty-fourth street and Broadway, New York City, is a roof garden now being built on the Thirty-third street wing, and will cost about \$20,000. It will be built of stucco with large French bay windows at the sides. The architect is W. H. Fenn, Jr.

SUBURBAN DWELLING OF BRICK CONSTRUCTION

The Carrying of the Roof Down Over the Porches Flanking the House Proper Is One of the Noticeable Features

WE take pleasure in presenting upon the opposite page and that which immediately follows it the plans, elevations and miscellaneous constructive details relating to the design that embellishes the front cover of this issue of the paper. The subject is a suburban house of brick construction and in the treatment of the exterior the architect has carried the roof down over the porches flanking the house proper rendering it one of the noticeable features.

An examination of the first floor arrangement shows French windows connecting the dining and living rooms with a spacious porch, while the large bay in the dining room and the corner fireplace render the rooms exceedingly attractive and homelike.

The feature of the second floor arrangement is the placing of the bathroom directly over the pantry, thus necessitating only one line of plumbing.

The foundation walls are of concrete with spread footings under walls and piers.

The exterior walls are of brick well bonded and having a facing of tapestry or face brick with sill courses of stretchers laid on end as shown in the elevations.

The roof is designed to be covered with first quality shingles of cedar or cypress and to be dipped before laying.

The floor and the roof beams may be of spruce or hemlock, while the flooring is first quality maple. The trim is chestnut.

Finish of the Plastered Walls

The plastered walls of the living and dining rooms are to have a sand finish colored with selected pigments. The kitchen is to be hard finish. The bedrooms on the second floor are to be sand finish and colored with pigments the same as the first floor.

The bathroom floor is to be laid with white hexagonal tile, in cement bed, with neat cove and sanitary base. The walls are to be finished with a wainscoting of Keene's cement and hard finish.

The chimney is to be common brick on a concrete footing. The fireplace lining is to be of fire brick and a neat pattern in tapestry brick is to be used for the living room mantel. The hearth is to be laid with square red tile. The mantel is to have a heavy hardwood shelf.

The hardware throughout the house is to be of a dull bronze finish.

The house is to be heated by hot-air system with fresh-air intake and box. The heating pipes are to reach all rooms except the kitchen and plain wall registers are to be used.

The house is to be piped for gas and wired for electricity, the fixtures being of the combination type—four-drop pendant for the dining and living rooms, and bedrooms to have wall outlet fixtures

All exterior woodwork, doors, trim, etc., are to be painted three coats cream white, while all interior trim is to be stained.

According to the architect's estimate the cubic content of the house is as follows:

House, 30 x 38 x 23 ft. high....	26,220 cu. ft.
Cellar, 15 x 38 x 5 ft. deep.....	2,850 cu. ft.
Total.....	29,070 cu. ft.

Figuring the total cubic feet at a unit price of 19 cents gives an approximate cost of \$5,523.30.

The estimated cost of various parts of the work based on prices of materials and labor for New York suburbs is as follows:

Excavating	\$90.00
Grading	42.00
Masonry	1,590.00
Concrete and cement.....	500.00
Plastering	383.00
Carpentry	1,000.00
Mill work	568.00
Painting	160.00
Plumbing	335.00
Heating	260.30
Metal work	165.00
Tile and slate.....	80.00
Mantels	40.00
Fixtures, gas and electric work.....	250.00
Hardware	60.00

\$5,523.30

The suburban house here described was designed by Frank T. Fellner, architect, care *The Building Age* or 413 Caton avenue, Brooklyn, N. Y.

Foundations for the New Equitable Building

Reference has been made in these columns to the fact that the new foundations of the mammoth Equitable Building, work upon which is now in progress in lower Broadway, New York City, will be of the cofferdam type, but there are probably few who realize the magnitude of the work in question. It is estimated that the structure will weigh something more than 200,000 tons, of which amount approximately 45,000 tons will represent the steel framework. Around the entire site bedrock was located 80 ft. below the curb and on this bedrock the mammoth cofferdam which will form the true middle of the foundation, covering over 49,000 sq. ft., will be built. The cofferdam itself when completed will consist of a solid concrete wall 6 ft. thick and 80 ft. deep, reinforced by heavy steel rods.

On the Broadway side the cofferdam will extend 167 ft.; on the Nassau Street side 150 ft.; on the Pine Street side 304 ft., and on the Cedar Street side 315 ft., or a total of about 935 ft. of mammoth caissons of concrete and steel 80 ft. long, 6 ft. deep and of various widths, according to the requirements of construction.

While caissons were formerly built of wood, engineers have recently decided that reinforced concrete construction is preferable owing to the fact that when the caisson is finally filled with concrete it becomes a monolithic mass.

The estimated weight of the new Equitable Building contrasts with 188,500 tons of the new Municipal Building; 103,000 tons of the Woolworth Building, and 82,500 tons of the Singer Building. The 45,090 tons composing the steel framework of the new Equitable Building compare with 25,000 tons used in the Woolworth Building; 23,000 tons in the Municipal Building; 7000 tons in the Metropolitan Building, and 6100 tons in the Singer Building.

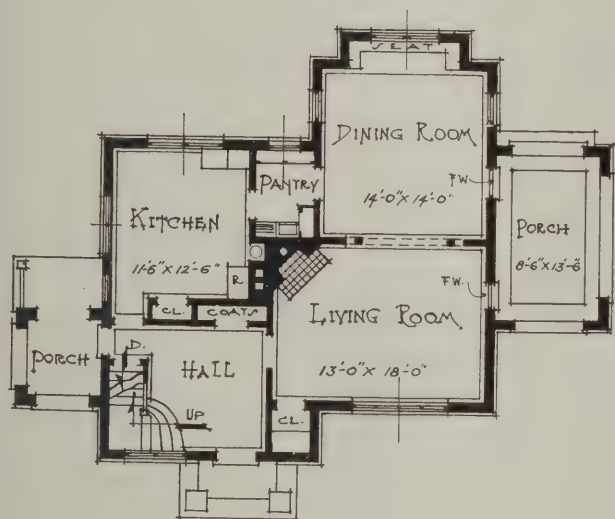
A shingle mill in Maine uses 2000 cords of paper birch each year in the manufacture of toothpicks.



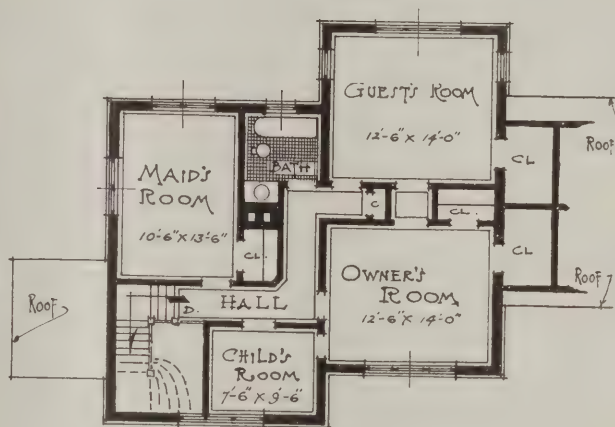
▼ FRONT ELEVATION ▼



▼ SIDE ELEVATION ▼



▼ FIRST FLOOR PLAN ▼



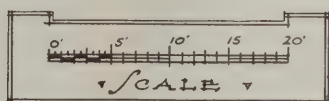
▼ SECOND FLOOR PLAN ▼

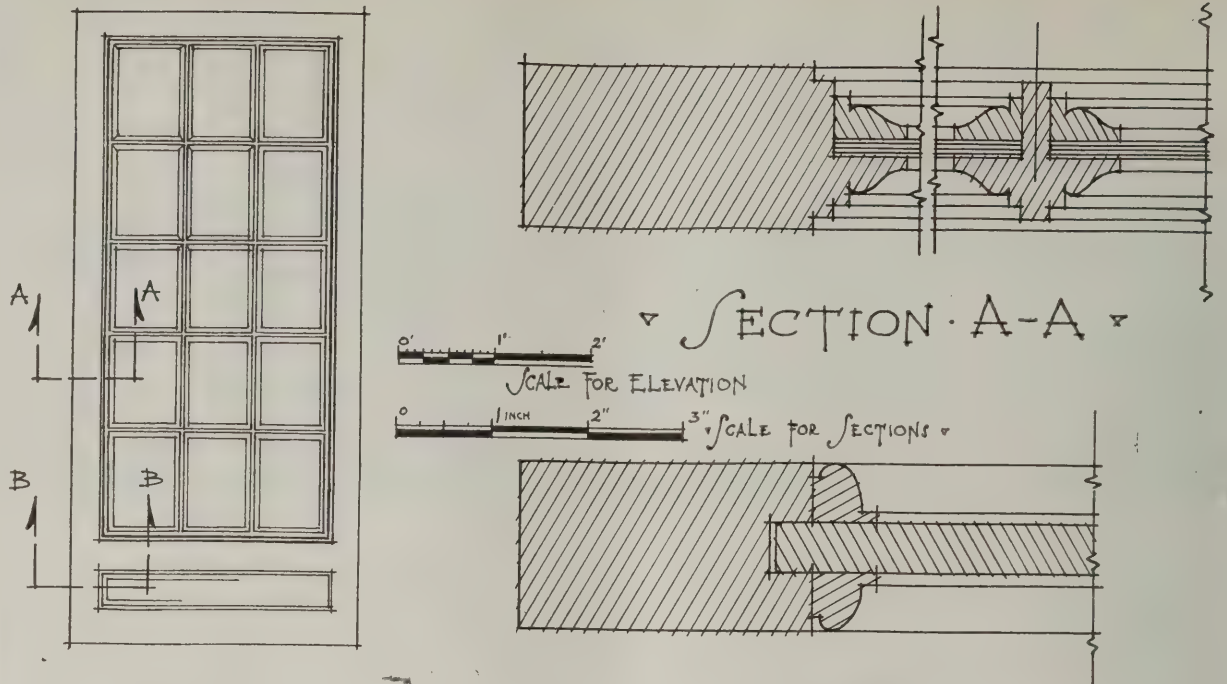


▼ REAR ELEVATION ▼



▼ SIDE ELEVATION ▼

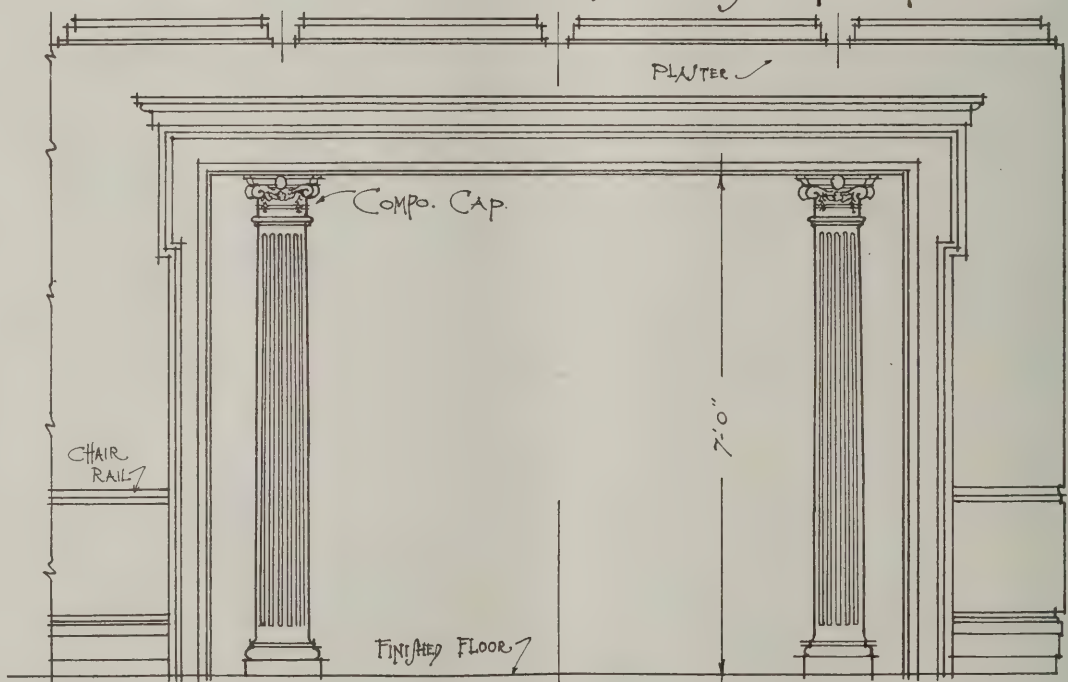




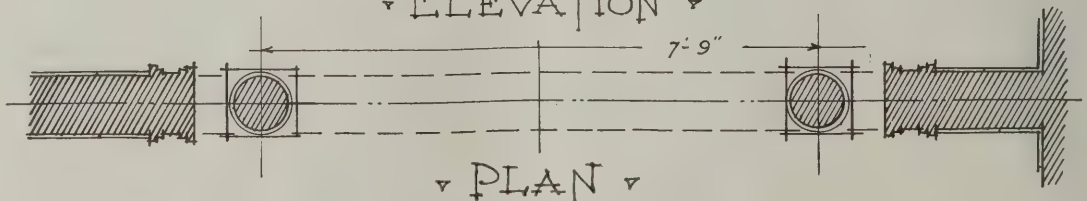
▷ ELEVATION ▷

▷ SECTION · A-A ▷

▷ DETAIL · FOR · FRENCH · WINDOWS · TO · PORCH ▷



▷ ELEVATION ▷



▷ PLAN ▷

▷ DOORWAY CONNECTING LIVING AND DINING ROOMS ▷



AGREEMENTS RESTRICTING COMPETITION

Legal Phases of Contracts—Bidding on Public Work—Sales of Good Will—Agreements Not to Re-Engage in Business

By A. L. H. STREET



SINCE any contract which tends to suppress competition in trade is carefully scrutinized by the courts before it will be declared to be legally enforceable, a general view of the policy of the law on this point should prove interesting, especially as applied to cases where a builder or architect agrees to refrain from competing for a contract, or where, in selling his business, he agrees with his successor that he will not engage in competition with the latter.

All the courts declare that any agreement between bidders for public work, designed to stifle competition, is void and unenforceable as being against public policy; and there is a strong tendency to apply the same principles to bidding for private work, though the public interest in the former class of contracts is much greater, and they will be more closely scrutinized.

Agreement Abandoned by Builder

An agreement by a builder, who negotiated for a contract for construction of a factory building, to abandon the negotiations and permit another to obtain the contract, was upheld by the Alabama Supreme Court, in the case of *Moore vs. First National Bank of Florence* (36 Southern Reporter 777), as against objection that the agreement was void as being violative of public policy; the court holding that a promise by the second party to the builder to pay a debt owing by the builder to a third person was sufficient consideration to sustain the builder's agreement to withdraw his competition. The court said: "The withholding, by agreement, of competition for business, though the business involve but a single transaction is, when not opposed to public policy, a valuable consideration on which to rest the agreement. The public had no interest in the letting of the contract for the mill building, and so no interest in maintaining competition.

But the Texas Court of Civil Appeals, held in the case of *Daily vs. Hollis*, 66 Southwestern Reporter, that where two competing building contractors agree as to the amount each shall bid for doing certain work, on an understanding that the successful bidder shall share his profits with the other, the successful bidder is not liable to the other on such agreement; the same being contrary to public policy. The court said that to encourage such practice would be to uphold double dealing and fraud and to retard the making of desirable improvements, and that "the law will not compel the parties to such an agreement to make a fair division of the spoils of their unlawful enterprise." But the court recognizes the right of two rival builders to contract jointly to perform a single piece of work, under belief that their association will be to their mutual advantage and enable them to better carry out the contract.

Effect of Fictitious Bidding

The United States Supreme Court holds that bidders for public work must use the utmost good faith toward the authorities receiving their bids, and that an agreement between two contractors to combine their interests and put in bids known to each other, the highest bid being fictitious and made only for the purpose of making an appearance of competition, is

illegal and void, without regard to its actual effect; since there is a natural tendency to induce the authorities to believe that the competition is real, and the lowest bid a reasonable one. The court says that the validity of an agreement between rivals seeking contracts for public work does not depend upon whether the public is actually injured, but on the purpose of the parties. (*McMullen vs. Hoffman*, 19 Supreme Court Reporter 839.)

When Building is Unlawful

Following this doctrine, the Idaho Supreme Court has held that any agreement respecting public contracts to be awarded on bids which tends to deprive the people of the advantage of competition in bidding is unlawful and void. (*Brady vs. Yost*, 55 Pacific Reporter, 542.) In a Montana case it appeared that plaintiffs filed a proposal with a school board to erect a high school building, including labor and materials. Defendant bid on the furnishing of stone alone; and both bids were rejected. To prevent re-advertisement and further competition, it was agreed between the bidders and the board that defendant should be awarded the contract for the stone at a certain price and the plaintiffs the contract for the rest of the materials and the construction of the building. On these facts, it was held by the Supreme Court of Montana that the agreement was void, so far as it bound defendant to pay plaintiffs any part of the proceeds of his contract with the board. (*Whale vs. Harrison*, 67 Pacific Reporter, 934.) The court said: "The weight of the authority is in support of the propositions: (1) As between bidders, each bidder must be left free to act according to his own judgment; (2) it is not the results of the agreement, but the object and possible effect thereof that determines its validity; and (3) any agreement which in its object or nature is calculated to diminish competition for the obtainment of a public contract to the detriment of the public, is void."

When Bids Are Against Public Policy

In a somewhat similar case, arising in New York, it was held by the Court of Appeals, that where bids for a public improvement were thrown out, and one bidder agreed to permit another to underbid him on a promise by the latter to purchase his materials at a specified price, the promise was not enforceable, being against public policy. (*Baird vs. Sheehan*, 60 North-eastern Reporter, 1107.) In a Texas case, it was shown that three architects competed for the furnishing of plans and specifications for a country court house. While it was still unknown whose plans would be accepted, it was agreed that the competing architects would refrain from further contest and permit the county commissioners to make a selection from the plans submitted, but that all three should share equally in the compensation. Uninfluenced by the agreement, the commissioners chose one of the sets of plans, but the architect who submitted them refused to account to the other architects for their agreed share, whereupon they sued him. His defense was that their agreement was void as being in restraint of competition, but that defense was rejected by the Texas Supreme Court, which sustained the agreement, saying: "It does not appear how such an agreement could affect the county, whose officers had at the time the offers of the architects before them, which the agree-

ment in no way interfered with. (Flanders vs. Wood, 18 Southwestern Reporter, 572.)

The Oklahoma Supreme Court has adjudged void a secret agreement between bidders for a public contract, to bid on separate parts of the work, on an understanding that if the bid of one for the larger portion of the work should be accepted, both should share in the compensation. (Citizens' National Bank of Chicago vs. Mitchell, 103 Pacific Reporter, 720.) And the Georgia Court of Appeals holds that although honest and open co-operation between two or more contractors for the purpose of securing a contract for the construction of a public improvement is not within the rule prohibiting contracts to stifle competition, agreements which in their operation upon the action of the parties tend to restrain their natural rivalry and competition in bidding are against public policy. (Virginia Bridge & Iron Company vs. Crafts, 58 South-eastern Reporter, 322.)

Agreements Not to Re-engage in Business

Closely related to the subject above treated, is the question whether a builder or architect, in selling his business, may legally bind himself not to compete with his successor. As a general rule, the law will uphold such an agreement, if the contract be limited to the territory in which the seller of the business has operated, but in some states it is held by the courts that there must, also, be a reasonable limitation as to the time during which the seller's competition is to be barred. All the courts, however, agree that the principal test of the validity of such contracts is whether they are reasonably necessary to secure the purchaser in the enjoyment of the good will of the business bought. Proceeding upon the theory that "competition is the life of trade," and that the public is entitled to the advantages to be derived from every business man's activities in his chosen vocation, the courts originally refused to sanction any agreement whereby one attempted to bind himself not to engage or re-engage in any legitimate pursuit; but later this strict rule was relaxed on consideration of the injustice that is done the purchaser of the good will of an established business in permitting the seller to attempt to take back what he has sold; especially if his re-entry in business occurs before the purchaser has had an opportunity to become acquainted with his trade. Applying these principles to the building trades, the Indiana Appellate Court has declared that an agreement by contractors engaged in the business of erecting public buildings, etc., in disposing of their business in good faith, to refrain from bidding on public work within the county for a period of five years was not invalid as being in restraint of trade. (Trentman vs. Wahrenburg, 65 Northeastern Reporter, 1057.)

California's Tenement House Law

The new California tenement house law went into effect August 10, and its effect was anticipated by many architects and owners by endeavoring to get permits issued under the old law, regardless of when actual construction may begin.

This statute applies to apartment houses for four or more families, and is said to affect the small apartment houses on 25-ft. lots. It contains provisions intended to give tenants more light and air, and also to limit the height of frame apartments. The new law requires standpipes from the ground to the roof, fitted with fire plugs and firmly secured to the front of the building. There must also be a metal fire escape on the front of the building and a similar fire escape in the rear, this regulation applying to buildings of three or more stories.

Where apartment houses are built on hillsides, the greatest height can be but three stories and basement. A basement or cellar may be used only for social halls or reception rooms, but not for living rooms, stores or commercial purposes of any character; and even where there is a sharp decline in the land the greatest height of the cellar may not be over 14 ft.

The minimum size of "lot-line courts" is 6 by 6 ft., and each light-well must have a passage at least 3 ft. wide to the street or rear; such passage not to be closed by any door. Any closet of over 25 sq. ft. must have a window opening on a light well or a street.

Ordinance Regulating the Erection of Steel Frame Buildings in Pittsburgh

The city of Pittsburgh has just enacted into law an ordinance authorizing and regulating the erection of steel frame structures and the use of iron and steel in the construction of buildings. This ordinance was prepared by the Commission for the Revision of Building Laws of the city and of which Edward Stotz, architect, is chairman. A true and correct copy of the ordinance has been issued in pamphlet form by the Commission for the purpose of making architects and engineers acquainted with the provisions thereof. The secretary of the Commission is William S. McDowell, 1402 First National Bank Building, Pittsburgh.

Lumber Output Excessive

Our California correspondent says that Pacific Coast lumber prices, which started the year with an upward movement and reach a high level during the spring, have been sagging badly for the last two months, since weather conditions have permitted the full operation of the many mills of Oregon, Washington and California. The coastwise market for common lumber is in worse shape than anything else, as the outlet is limited; but a decidedly easy feeling has developed in the off-shore and eastern business.

At the recent meeting at Roymond, Wash., of the West Coast Lumber Manufacturers' Association, the opinion was brought out that more lumber is being manufactured than is being sold, and curtailment of the output was said to be imperative. A possible solution of the problem was suggested in the proposition that lumbermen manufacture more of their best grades into doors, sash, etc., as it was said that a large proportion of doors and sash used in the Northwest were made from Washington stock sent East to be manufactured.

It was stated about the first of August that over 2,000,000 concrete blocks had up to that time been used in the new \$10,000,000 steel plant in course of erection at New Duluth, Minn. Work is being commenced on 200 concrete block houses and 65 apartment buildings, each to accommodate six families. The plans prepared by Dean & Dean, architects, Chicago, Ill., call for block walls and monolithic floors.

It is announced that the architect selected to design the new building of the Pan-American States Association to be erected in New York City is Francis H. Kimball, with offices in the Empire Building, 71 Broadway, New York City. The building will be 25 stories high and will be designed to house the consulates-general of all countries in the western hemisphere in conjunction with the export exhibits and selling offices of the great American concerns now in the South and Central American markets.

TWO LOG CABIN DESIGNS FOR FOREST CAMPS

Description and Details of Cabins Built According to Two Distinct Methods
in General Use for the Construction of Log Structures

LOG houses are constructed in two different ways, this difference being in the manner in which the logs are framed together at the corners. Examples of both methods of construction are given here. The old-fashioned, time-honored method of Daniel Boone and Davy Crockett was used in building the cabin shown in Figs. 1 and 2, and the plan, elevation and details of which are shown in Figs. 3 to 15. In this construction the logs are cut and halved together. The other method, by which the cabin illustrated in Fig. 16 was constructed, has developed since finished lumber became more plentiful and time more valuable than in the days of the pioneers. In the latter method board corner posts are erected on the sill frame and the ends of the logs simply abut against one another

the stove pipe from the kitchen range to pass through the partition into the flue of the chimney.

The front door leads directly from the porch into the dining room, and doors connect each of the other rooms with the latter. The dining room is lighted by one window each in the front and rear walls. Each of the other rooms is lighted by two windows—one in each exterior wall. An outside door leads from the kitchen to a small porch at the rear, from which access to the ground is provided by a flight of steps.

The foundation upon which the sill frame rests is a dry wall built of field stones, about 18 in. in thickness.

In choosing timber for the sill frame, it is well to select logs of larger diameter than those used in the remainder of the wall. The logs of the sill are framed



Two Log Cabin Designs for Forest Camps—Fig. 1—Log Cabin Built in Apache County, Arizona, Where Timber Is Plentiful. The Porch Pillars are of White Birch

and are nailed to these corner posts. The pioneer method will be first described.

The log cabin illustrated in Fig. 1 was built in Apache County, Arizona. It is about 26 x 40 ft. in size and, with its large dining room, three bedrooms and kitchen, furnishes ample accommodation for a party of six or eight campers or a family of moderate size.

The large porch which extends across the front of the building gives plenty of space for sheltered promenades on rainy days, and the spacious dining room, 12 x 24 ft. in dimensions, is of sufficiently ample proportions to warrant the finishing of the floor in a manner suitable for dancing, if desired. The heating of this room is done by a fireplace, whose chimney is conveniently placed against the partition between the dining room and kitchen, thus permitting

into one another in the manner shown in the details, Figs. 11 and 12, except that, in the case of the sill frame, the bottom cut in the log is omitted. The cut is made $\frac{1}{2}$ in. wider than the diameter of the log which it is to receive. A 2 x 4-in. plank is nailed to the inner side of the sill log, and the log is rabbeted to receive it, as shown in the sections through walls, Figs. 7 and 8. A 2 x 4-in. strip is nailed to the side of the 2 x 6 and these two pieces form a bearing surface for the ends of the 2 x 8-in. joists.

The top log is surmounted by a 2 x 6-in. plate, over which the 2 x 4-in. rafters are cut, and upon which rest the 2 x 4-in. tie beams which are nailed to the rafters. The roof is one-third pitch. The rafters are spaced 30 in. on centers and upon them is placed a covering of 1 x 6-in. sheathing spaced 8 in. on centers, over which shingles or shakes are laid. The planceer

at A, Fig. 6, and the framing details for which are presented in Fig. 15, is made of $\frac{3}{4}$ x 4-in. matched stock. It is secured at the wall end by nailing to the surfaces of bevel cuts on the ends of the top logs of the wall and at the outer end by nailing to the 1 x 4-in. fascia which covers the ends of the rafters. The chinks between the logs are plastered with lime mortar.

The flooring is of 1 x 4-in. and the ceiling of $\frac{3}{4}$ x 4-in. matched and beaded stock.

The construction of the windows is shown by the horizontal section through window jambs, Fig. 13.



Fig. 2—Detail of Porch and Front Steps of Cabin Illustrated in Fig. 1

The ends of the logs are beveled to a thickness of 8 in., and a 2 x 8-in. strip is nailed to the projecting log ends. A 1 x 8-in. finishing piece forms the inside of the jamb. The outside and inside trim around the window sash is of 1 x 4-in. finished stock.

The door frames are of the same material and constructed in the same manner as the window frames. A horizontal section through exterior door and frame is shown in Fig. 14, and the details of the exterior doors are clearly illustrated in Fig. 9. These have four panels each, and the latter are constructed of $\frac{3}{4}$ x 4-in. matched and beaded stock, placed diagonally.

The interior doors, a detail of which is given in Fig. 10, are made of $\frac{3}{4}$ x 4-in. matched boarding, running longitudinally, and reinforced by 1 $\frac{1}{4}$ x 6-in. horizontal pieces top and bottom, and a 1 $\frac{1}{4}$ x 4 $\frac{1}{2}$ -in. diagonal brace. Strap hinges are used for both exterior and interior doors.

White birch is employed for porch columns, rails, etc., as shown in Figs. 1 and 2 of the illustrations.

Following is a statement of the principal items of the bill of material showing the sizes of timber and lumber used in the construction of the cabin represented in Fig. 1:

Used in Structure	Dimensions
Porch posts.....	6 in. diam. x 7 ft. long
Logs.....	12 in. diam. and from 14 to 22 ft. long
Joist, sill.....	2 x 6 in. and 2 x 4 in.
Joists.....	2 x 8 in.
Sills, front porch.....	2 x 6 in. and 2 x 4 in.
Joists, front porch.....	2 x 6 in.
Joists, front porch.....	2 x 6 in.
Joists, rear porch.....	2 x 6 in.
Sill, rear porch.....	4 x 6 in.
Blocks, rear porch.....	6 x 6 in. x 1 ft.
Steps, front and rear.....	2 x 12 in.
Ceiling joists.....	2 x 4 in.
Rafter plate.....	2 x 6 in.
Studs, partitions.....	2 x 4 in.
Plates, partitions.....	2 x 4 in.
Girts and braces, partitions.....	2 x 4 in.
Rafters, rear porch.....	2 x 4 in.
Plates, rear porch.....	2 x 6 in.
Side of rear porch.....	2 x 4 in.
False jambs, window.....	2 x 8 in.

False jambs, doors.....	2 x 8 in.
Roof boards, rear porch.....	1 x 6 in.
Rafters, common.....	2 x 4 and 2 x 6 in.
Hip rafters.....	2 x 8 in.
Ridge board.....	2 x 8 in.
Fascia.....	1 x 4 in.
Roof boards, lower tier.....	1 x 12 in.
Roof boards, remainder.....	1 x 6 in.
For hips.....	1 x 12 in.
To plaster between logs.....	3 bushels of lump lime
To plaster between logs.....	$\frac{1}{2}$ load of sand

Bill of material for the exterior and the interior doors of the cabin as shown in Figs. 9 and 10.

Exterior Door	
2 pieces 1 $\frac{1}{4}$ x 4 $\frac{1}{2}$ x 12 ft.	Y. P., S 1 S & 2 E
1 piece 1 $\frac{1}{4}$ x 6 in. x 2 ft.	
1 piece 1 $\frac{1}{4}$ x 8 $\frac{3}{4}$ x 2 ft.	
28 ft. B. M.	
1—1 in. x 8 in. x 18 ft.	$\frac{3}{4}$ in. x 4 in. M. & B. backing
1 $\frac{1}{2}$ in. x 2 in. x 18 ft.	Y. P. Frame, S 1 S & 2 E
1 pair of Strap Hinges and Screws.	Y. P. Stop, S 1 S & 2 E
Interior Door	
2—2 in. x 4 in. x 9 ft.	Jamb sized to 3 $\frac{3}{4}$ in.
1—1 $\frac{1}{4}$ in. x 4 $\frac{1}{2}$ in. x 6 ft.	Brace S 1 S & 2 E
1—1 $\frac{1}{4}$ in. x 6 in. x 5 ft.	Crosspiece.
1— $\frac{1}{2}$ in. x 1 $\frac{3}{8}$ in. x 16 ft.	Stop S 1 S & 2 E
22 ft. B. M.	
1 pair of strap hinges and screws.	

The second of the two cabins, as illustrated in Fig. 16, is built by the newer method of supporting the logs by means of plank corner posts. The old method makes a cabin of more picturesque aspect and the construction insures a more rigid structure, but the new method saves much time and labor and is therefore cheaper. In the cabin shown the exterior walls are made of spruce logs 8 to 9 in. in diameter and 16 to 18 ft. in length.

This cabin has a door and window in the front wall, one window in the rear wall and two windows in each of the side walls. It is 16 x 18 ft. in dimensions and has a single room.

In preparing the logs, each is peeled with a draw shave, which entails considerable labor. A good man working hard can peel 8 or 9 logs in a day. This operation must be performed in the winter; other-

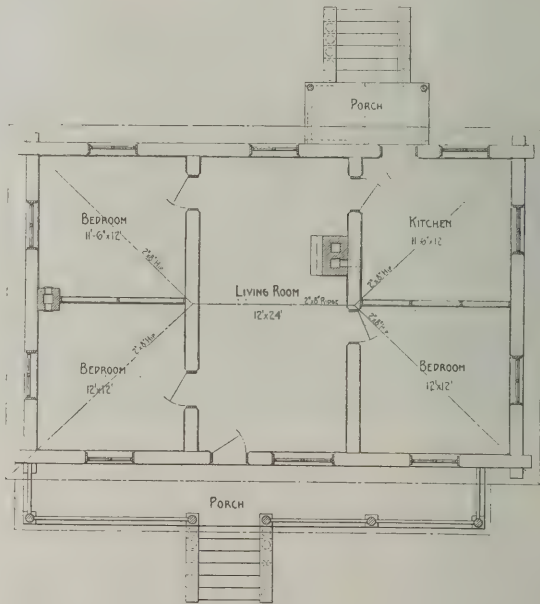


Fig. 3—Plan of Cabin Shown in Fig. 1—Scale 1/16 In. to the Foot

Two Log Cabin Designs for Forest Camps

wise the logs will mildew and turn black. March and April are the best months for this work.

No excavation is made in constructing the foundation, as it is stated that no settling of the building will occur if the turf is not disturbed. The sill frame is supported on rocks placed at the four corners and at points midway between.

After laying the foundation stones the first operation is to place the sills, which consist of four logs, halved together at right angles to each other, the same as shown in the details, Figs. 11 and 12.

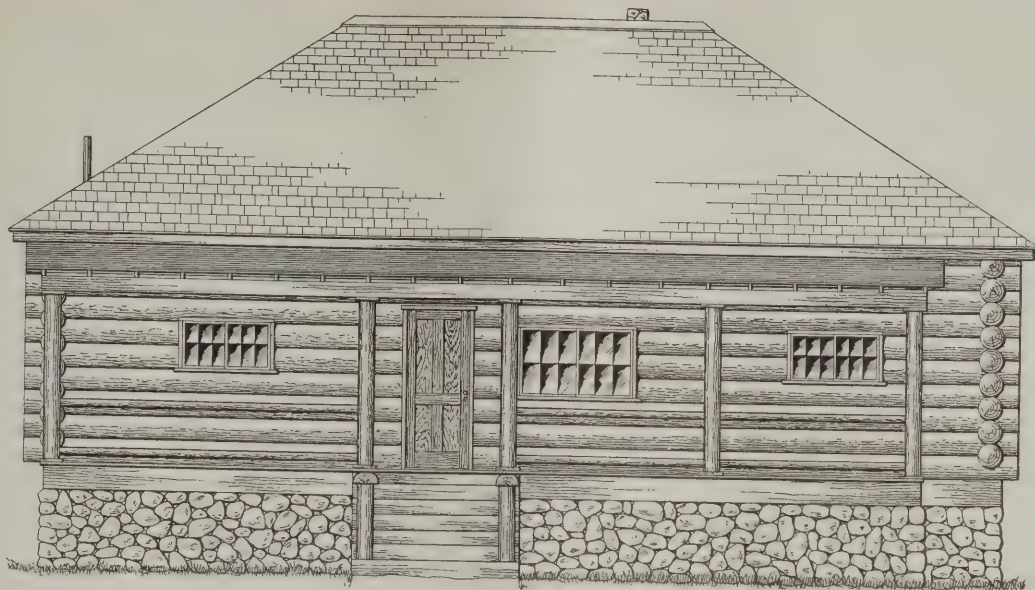


Fig. 4—Front Elevation—Scale $\frac{3}{8}$ In. to the Foot

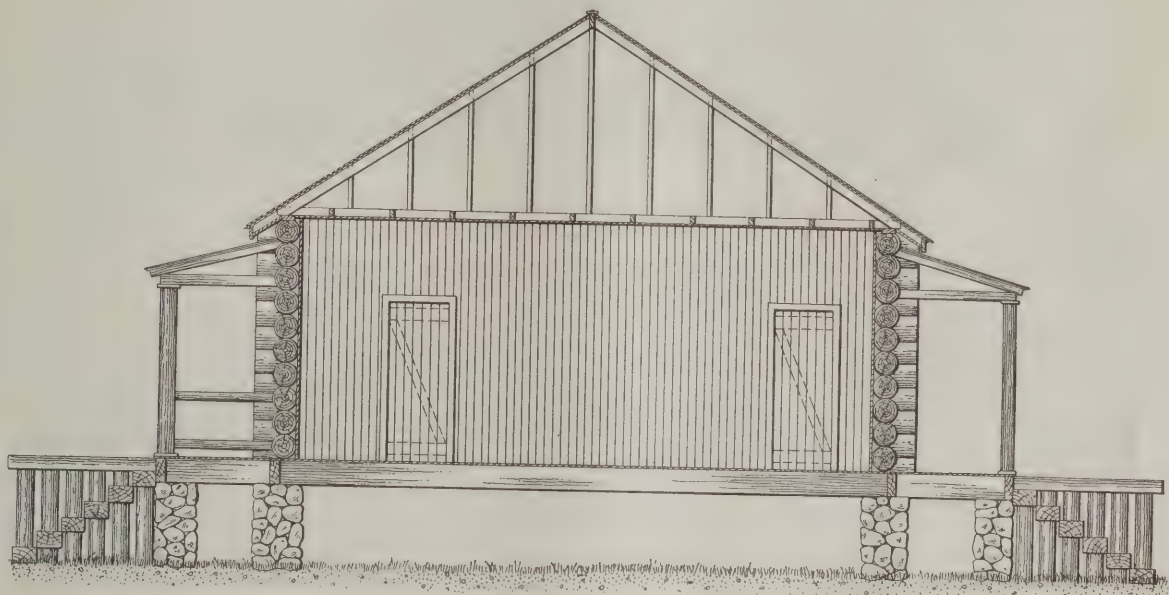


Fig. 5—Vertical Cross Section Taken So as to Cut Both Front and Rear Porches—Scale $\frac{3}{8}$ In. to the Foot.

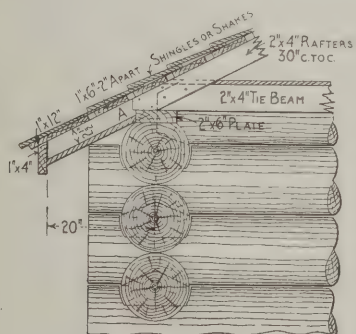


Fig. 6—Detail at Eaves—Scale $\frac{3}{8}$ In. to the Foot

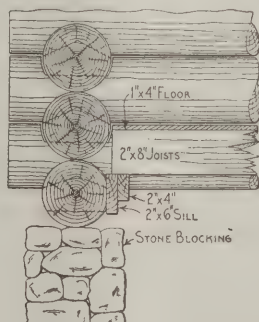


Fig. 7—Detail at Sill—Scale $\frac{3}{8}$ In. to the Foot

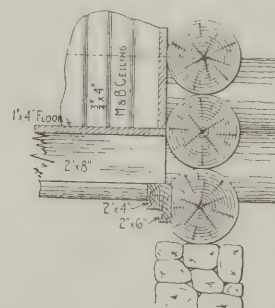


Fig. 8—Detail at Sill, Showing Partition—Scale, $\frac{3}{8}$ In. to the Foot

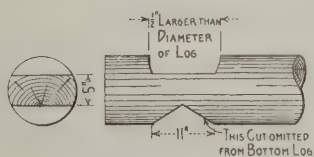


Fig. 11—Detail at A, of Fig. 6—Scale $\frac{3}{8}$ In. to the Foot

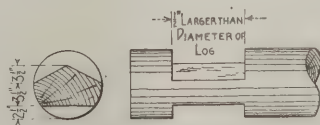


Fig. 12—Detail of Side Logs—Scale $\frac{3}{8}$ In. to the Foot

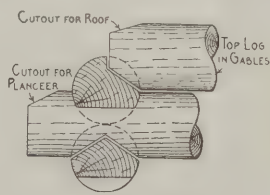


Fig. 15—Detail at A, of Fig. 6—Scale $\frac{3}{8}$ In. to the Foot

Each of the corner posts erected at the corners of this sill frame is made of two 2 x 5-in. planks 7 ft. long, placed edge to edge and spiked together. The post is placed in an upright position and the lower end is spiked to the corner of the sill frame. The logs for the exterior walls are then cut to length and trimmed so that they can be laid one upon the other between the corner posts and spiked to the latter. The logs are not halved at the end, but the individual logs composing the side and end walls are allowed to abut against each other alternately. Each end of each log is securely spiked to the corner post plank.

The windows are double-hung, 12 x 20 in. in dimensions. The door is 2 ft. 8 in. x 6 ft. In the construction of the windows the sill is formed by halving the upper side of the log for a distance equal to the width of the window, while a corresponding cut is made in the log above, forming the top of the frame. The sides of the frame are made by spiking 2 x 6-in. planks in a perpendicular position between the ends of the notches in the upper and lower logs. The doors are framed in the same way.

The plate logs at the top of the side wall are notched at each end on the under side, to fit over those of the

All" roofing composition to give a perfectly tight roof. In the construction of the floor a 2 x 4-in. piece is spiked on the pot sill in the center of the log and the ends of the floor timbers are notched to fit over the sill log and abut against the 2 x 4. In making the notch a point is marked on the end of the log measuring 3 in. from the top and the under half of the timber is cut to fit. Before the cut is made care should be

taken to place the log with the straight side up. The floor timbers are constructed of logs 6 in. in diameter. On the floor timbers is laid a rough floor of planking and then a finished floor of matched spruce, 7/8 in. in thickness.

Shelves and cupboards are placed to suit the convenience of the occupant, and a fireplace and chimney may be constructed, if desired.

Following is a statement of

principal items in the bill of material for the cabin shown in Fig. 16.

- Logs 6,000 timber ft.
- 2 x 6-in. planking.....1,200 timber ft.
- 7/8-in spruce matched lumber..... 600 timber ft.
- 5 double rolls best "Over-All" roofing.
- Total cost of the structure, from \$300 to \$350.

The log cabin illustrated in Fig. 16 was constructed by Gilbert & Combs, at the West Outlet Camps, West Outlet, Maine.

At the summer meeting of the Association of Eastern Foresters, held at the State Ranger School at Wana- kena, N. Y., July 9 to 20, some of the topics discussed were: "The Cubic Foot Standard for Measuring Lum- ber"; Regulation of Slash Disposal"; "How Far Can

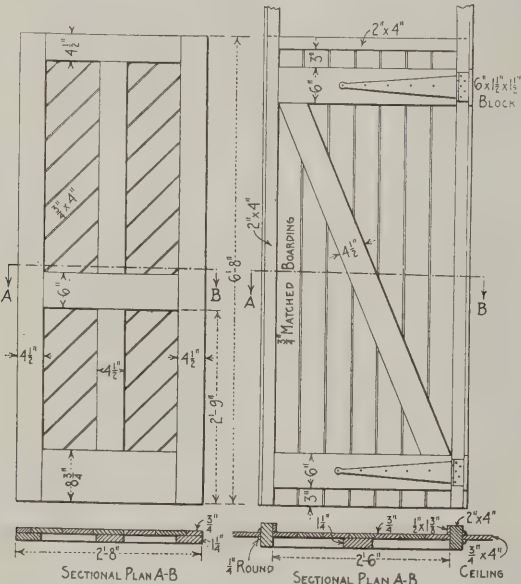


Fig. 9—Exterior Door
Scale, 3/8 In. to the Foot.

Fig. 10—Interior Door
Scale, 3/8 In. to the Foot.

Two Log Cabin Designs for Forest Camps

front and rear walls. This holds the corner posts securely in place. The roof is supported on purlin logs placed parallel with the ridge pole, notched over the logs forming the end walls and spaced at intervals of about 3 ft. Sheathing is laid on these purlins, the pieces running perpendicular to the ridge pole. Over this is laid a waterproof covering of the best "Over

or Should Field Studies Be Standardized," and "What Can We Do to Increase the Supply of Rangers or Woods Foremen."

It is estimated that there are over one hundred million feet of white and Norway pine on the river bottoms in the Menominee Valley.



Fig. 16—Cabin Built at West Outlet, Maine, by the Second Method Described Using Board Corner Posts

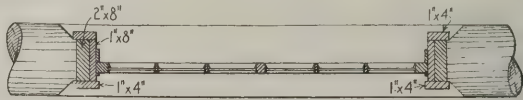


Fig. 13—Horizontal Section Through Window Jambs and Sash—
Scale, 3/8 In. to the Foot

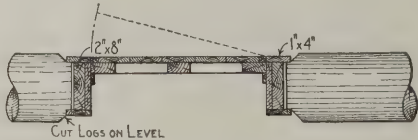


Fig. 14—Horizontal Section Through Exterior Door and Frame—
Scale 3/8 In. to the Foot

A SIX-ROOM BUNGALOW OF "POURED" CONCRETE

Monolithic Concrete Construction in Connection with Which Metal "Forms"
Were Used—Rapid System of Pouring the Concrete

AN interesting addition to the series of attractive designs of that cozy-cottage-type of architecture generally designated as the bungalow is the six-room dwelling which we illustrate upon this and following pages and which constitutes an excellent example of "poured" concrete work. By means of the system used the walls are monolithic and the pouring was accomplished in a rapid manner. The general appearance of the finished structure may be seen from an inspection of the half-tone engraving wherein the house in question is the second in the row, counting from the extreme right.

An inspection of the floor plan upon this page shows a living room of liberal proportions which is entered directly from a broad and airy porch. It is separated

short flight on the outside and which are shown in the street view of the house.

In constructing the walls, partitions, etc., of the bungalow Milton Dana Morrill's system of poured concrete was used in connection with his steel forms. The process of pouring is simple and rapid, the steel forms being of such a nature that they are set up largely by unskilled labor and the carpenter of ordinary experience has little or no difficulty in entering this new field. The standard equipment is adjustable to buildings of all dimensions and designs by the use of lapping corner plates. After the forms are once assembled, proper core mixing and pouring are all that is necessary to obtain the best results.

We understand that in more than 50 buildings which

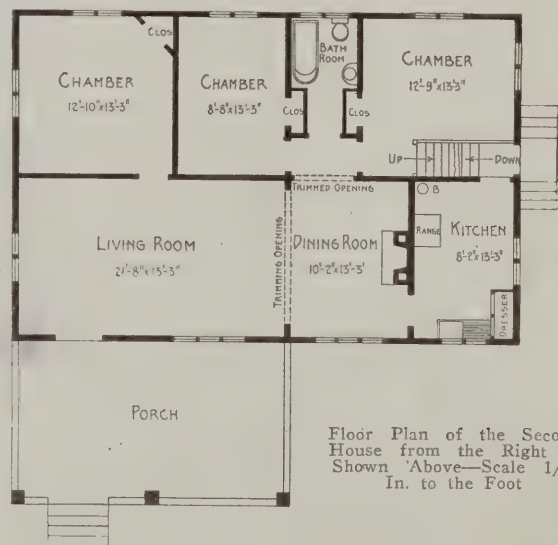


Street Scene Showing Row of Houses Constructed of "Poured" Concrete, the Second One from the Extreme Right Forming the Subject of this Article

from the dining room by a trimmed opening of such width as to practically give the two rooms the appearance of one. The feature of the dining room is the open fireplace which is in the center of the partition wall separating it from the kitchen, one of the flues serving for the kitchen range. The effect as one enters the living room from the outside is impressive by reason of the extended view presented to the eye and which terminates in the open fireplace in question. At the right of the dining room is the kitchen fitted with range, hot-water boiler, sink and dresser, the sink being placed directly under a window which affords ample light.

On the main floor is also the bathroom fitted with tub, lavatory and water closet, and there are three sleeping rooms, each having a clothes' closet opening out of it. The bathroom is so placed as to be readily accessible from two of the bedrooms as well as from the dining room by way of a trimmed opening.

The stairs to the attic space rise from the hall or passage way between the dining room and one of the sleeping rooms. Directly under this flight are the stairs leading from the kitchen to the cellar which is excavated only under the extreme right-hand end of the bungalow. Entrance to the kitchen is from the landing platform of these stairs which opens upon the



Floor Plan of the Second House from the Right as Shown Above—Scale 1/16 In. to the Foot

A Six-Room Bungalow of "Poured" Concrete—Milton Dana Morrill, Architect

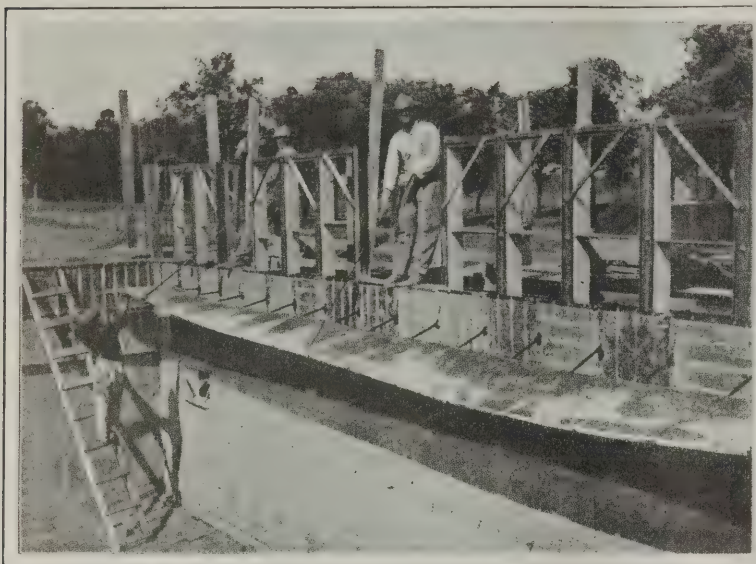
have been constructed by the use of this system clean coal ashes have been utilized in place of gravel, thus employing what in many places is a waste product.

This makes an excellent concrete for foundations and house construction, giving ample strength for the lighter types of buildings.

In the second half-tone engraving is shown the forms or molds being swung up into place for the purpose of pouring another course of concrete. It is stated that the 15 plates or 60 sq. ft. of forms were swung into

The steel forms used in the work are made by Read & Morrill Concrete Forms Company, 179 Joralemon street, Brooklyn, N. Y., and were designed by Milton Dana Morrill of that company, who was also the architect of the bungalow here illustrated.

The work shown is in connection with the Cement City Development at High Lake, a suburb of Chicago, for E. A. Cummings & Co., of that city.



A Six-Room Bungalow of "Poured" Concrete. Swinging the Plates Into Position for "Pouring" the Concrete

position in less than five minutes' time. The molds are of standard unit type with variable corners, permitting any dimensions, also any thickness, and carrying out almost any shaped plan.

In the last half-tone illustration the molds or plates are shown swung up into position to be secured by wedge connections ready to pour the concrete. The plates, it may be interesting to state, are of No. 10 gauge pressed steel, there being no cast parts to break. The plates are locked and unlocked by the simple blow of a hammer.

When set up the molds form a trough around the walls. The trough is then poured full of concrete, and after it is allowed to harden the lower plates are loosened from the wedge connections and swung up in tiers into position on top again to be refilled, the wedge connections automatically bringing the plates into line. Window and door frames are built out the thickness of the wall and are dropped into forms where desired. As the steel forms are practically watertight a wet or slush mixture is utilized, and hydrated lime may be added for waterproofing purposes. This mixture leaves a straight, smooth-finished surface.

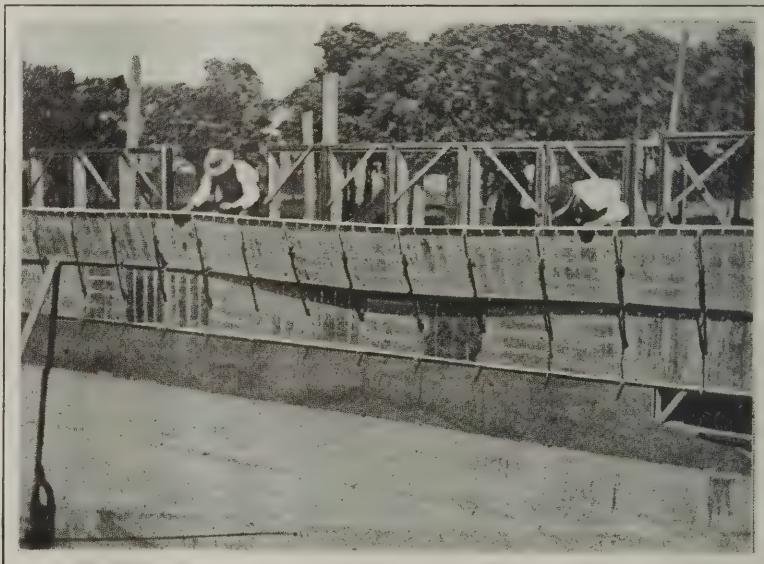
In southern climates the plaster is omitted, the walls being floated up to a sand finish as soon as the forms are removed. In colder climates a new hollow panel construction is used, giving insulation by means of the air space. This new method of pouring in steel forms is being largely adopted for foundations as well as for bungalows and houses in suburban land development. The system of pouring is extremely rapid, and in ordinary weather 2 ft. is completed at each operation. We understand that all the concrete work in the houses illustrated in the half-tone representing the street scene on the first page of this article was completed in an average of from four to five days.

Year Book of New York Society of Architects

We have before us a copy of the Year Book for 1913 of the New York Society of Architects, which has just been issued from the press and which shows considerable advance over previous issues in the collations of the various laws, ordinances, regulations and requirements of constant use to the architect. The book contains 306 pages, numerous illustrations, and is bound in black leather with flexible covers, while the edges of the leaves are finished in gilt. Among the very interesting matters is a complete list of architects of New York State, description of the City Departments, a checking list for specifications writing, and the Building Code of the city of New York with amendments to date. It has been re-paragraphed, subdivided, and

is printed on pink paper, which contrasts with the white pages and is therefore readily found.

There are ordinances on projections beyond the building line, requirements and fireproof partitions approved by the Bureau of Buildings, an article on indirect illumination illustrated by means of various interior views, and the new labor law governing the construction of factory buildings. There are regulations of the law under which the Bureau of Fire



View Showing the Plates or Molds Swung Up Into Place

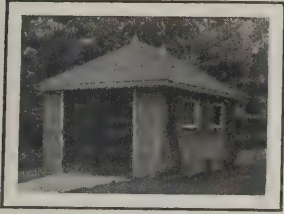
Prevention is now working; the new moving picture ordinance, which became a law the first of August, 1913; various tables of value to architects for quick reference purposes, and a list of coefficients for the construction of trusses.

A price of \$5 has been put upon the book by the Society because of the demand for it from others than architects, to whom the book is given free, the reason for this being to permit the book being placed where it is most needed.

INEXPENSIVE GARAGE FOR PRIVATE RESIDENCE

Design and Details of a Galvanized Iron Structure Built on Simple Lines and Rendered Fire Resisting—Some Interesting Figures of Cost

A CONSTRUCTION similar to that often used in connection with small buildings is employed in the case of the inexpensive garage, of which plan, elevations and details are shown herewith. The building is 18 ft. 6 in. wide, 20 ft. long, and is of light, yet substantial construction. The structure will be found to present a very neat and pleasing appearance if painted with the same colors as those used in the



treatment of the residence to which the garage belongs.

The foundation walls are of reinforced concrete, the footings of which, placed 3 ft. 6 in. below the ground level, are 3 ft. 3 in. in width and 12 in. deep. The first section of the wall above the footing is 1 ft. 3 in. in thickness; the second section 1 ft. in thickness. and the third and last section 9 in. in thickness. The floor is of granolithic composition, resting upon a gravel fill. The foundation wall footings are reinforced with two crossed layers of $\frac{1}{2}$ -in. reinforcing rods, spaced in 12-in. squares. The vertical reinforcement of the foundation walls consists of $\frac{1}{2}$ -in. rods

is provided in the other end of the building from which a stairway leads to the ground below. A 5-ft. 8-in. by 3-ft. 3-in. window is located in this end, and a similar one is placed in each of the side walls.

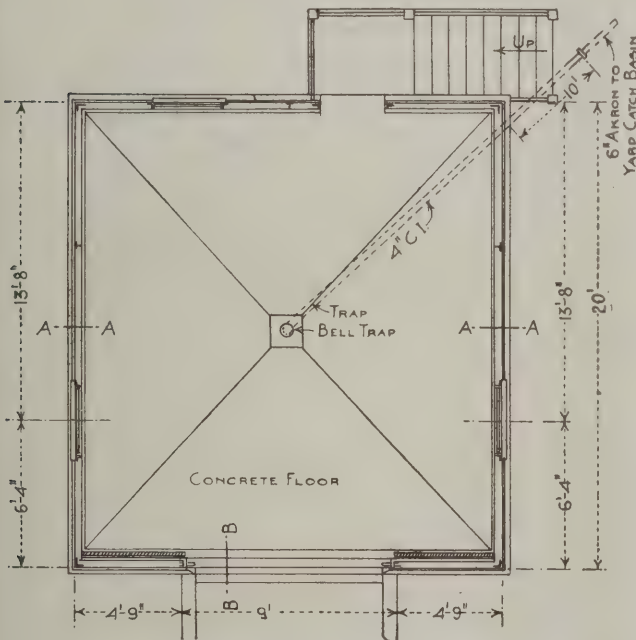
The roof frame is of spruce timber, carried by a belly-rod truss, covered with matched lumber, over which is laid a tar and gravel roof covering.

The fireproof garage here described is that of John Frost, and is located in the rear of 41 Worcester Square, Boston, Mass.

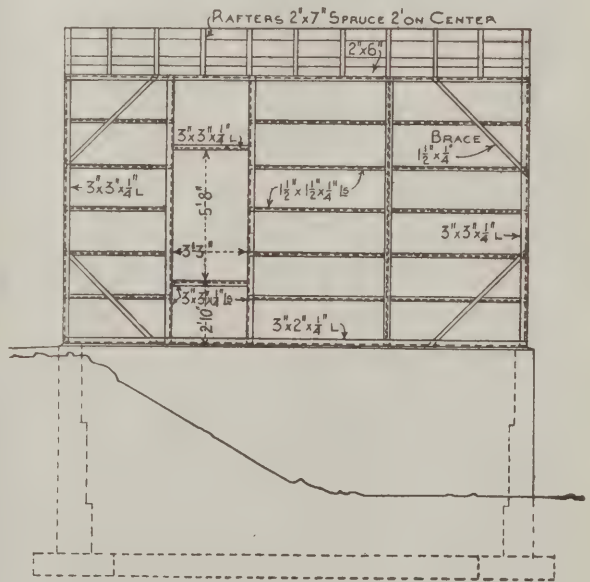
It was designed by Arthur W. Joslin, 161 Devon-



Front Elevation—Scale $\frac{1}{8}$ In. to the Foot



Floor Plan—Scale $\frac{1}{8}$ In. to the Foot



Framing Elevation of North or West Side—Scale $\frac{1}{8}$ to the Foot

Inexpensive Garage for Private Residence—Architect Arthur W. Joslin, Boston, Mass.

spaced 2 ft. on centers, the horizontal reinforcement of 1-in. rods being spaced 2 ft. on centers. The floor slopes to a central drain-pipe, provided with a bell trap, connected to 4-in. cast iron pipe, which connects on the outside of the wall with a line of 6-in. sewer pipe leading to the catch basin.

The frame of the walls is made of light structural steel angles, channels and T's, to which the wall sections of 24-gauge, V-crimped galvanized iron sheets are riveted.

The main entrance, 8 ft. 9 in. wide by 10 ft. 3 in. high, is closed by double sliding doors. A small door

shire St., Boston, Mass., who states that the total cost of the structure was \$1,075, which figures at the rate of \$2.90 per square ft. and 12 $\frac{8}{10}$ cts. per cu. ft.

One of the first examples of steel skeleton frame construction in the city of Chicago—the Rand & McNally building—has recently been taken down to make room for a more modern structure. According to D. H. Burnham & Co., the architects, the steel frame work was in such excellent condition that it could have stood for an indefinite period.

WAGES OF BUILDERS IN NEW YORK STATE

A Table Showing the Wages Paid in Various Branches of the Building Trades in Leading Cities of New York State

WE take pleasure in presenting to the attention of our readers a table showing the wages paid in the various branches of the building trades in leading cities of New York state together with those which prevail in some of the cities in Ohio, Michigan, Pennsylvania and Canada. The wage scale is computed on an hourly basis and has been compiled for the New York State Association of Builders by James M. Carter, its efficient secretary. The figures have been revised to July 1 of the current year.

It will be seen from an examination of the table

foot three-story frame building was to be moved to a site on Highland Avenue, and as that street was only 30 feet in width, the structure was sawed in two.

Estimating Among Building Contractors

The subject of estimating is one of never-ending interest among builders the country over, and the ever-increasing amount of unproductive time and very often money which contractors are called upon to expend in

Rates of Wages, Per Hour, Paid in Various Branches of the Building Trades

Name of the City	Brick-layers	Car-penters	Ce-ment Fin-ishers	Elec-tricians	Hoist-ing Engi-neers	Labor-ers	Lath-ers	Paint-ers	Plas-terers	Plumb-ers	Stone Masons	Stone Cutters	Steam Fitters	Struc-tural Iron Work-ers	Sheet Metal Work-ers
Albany.....	65	50	65	40½	\$3 to 4d	25-35	50	50	65	60	65	56½	60	62½	50
Amsterdam.....	60	45	50	\$2.75 to 3.25	\$3.50d	22	2.25 M	37½	60	46½	60	55	46½	50	45
Auburn.....	60	45	60	...	...	25-30	35	37½	60	50	60	60	50	...	...
Buffalo.....	65	45-50	40-50	56½	\$24w	22½-27½	45	\$3.50d	60	\$4.50	55	60	\$4.50	60	40-45
Corning.....	50	37½	...	40	...	20	35	40	50	45	50	50	50	...	45
Elmira.....	55	34½	55	37½	...	22	25	37½	55	44	55	50	44	...	35
Geneva.....	60	\$3.50	...	37½	...	25-30	\$3.40	\$3.25d	60	\$3.75	60	...	\$3.75	...	\$3.25
Ithaca.....	60	40½-45	...	31-40	31½	22-25	...	37½-40	60	50	60	60	50	...	35-40
New York.....	70	62½	62½	56½	75	37½	62½	50	68½	68½	57½	62½	68½	62½	62½
Niagara Falls....	62½	50	62½	37½	50	25	3½ yd.	31½	60	50	62½	50	50	50	50
Oswego.....	55	\$3.50d	55	\$3.50d	30	22½	30	\$3.00d	55	\$4.00d	55	55	\$4.00d	...	\$3.00d
Rochester.....	65	50	37½	50	...	25-28	\$2.25M	46½	65	50	65	56½	50	56½	46½
Syracuse.....	65	50	60	55	\$21-27 week	24-28	50	48	65	\$4.70d 58½	65	56½	\$4.70d 58½	60	50
Troy.....	60	45	50	\$3.00d	\$3.00d	22½-30	50	45	60	45	60	50	45	56½	\$3.00d
Utica.....	60	50	60	44	35	27½-30	50	44½	60	50	60	50	50	...	50
Cleveland, Ohio..	65	42½-45	40-50	50	60	25-30	62½	40	62½	56½	50	56½	50	60	37½
Detroit, Mich....	65	37½-45	...	\$3.75d	60	25-32	65	40-45	\$5.50d	50	50	62½	50	60-62½	37
Grand Rapids, Mich.	65	35-45	35	35-40	\$2.50-3.50	22 2-9 -30	50	35-45	55	50	40-60	50	50	50	35-40
Pittsburgh, Pa...	70	55	35-50	57½	\$4.50d or 62½	20-25	47½	55	62½	62½	55	55	56½	52½	55
Toledo, Ohio.....	65	42½	50	43½	45	25-35	50	40	62½	56½	50	56½	56½	60	37½-42½
Toronto, Ont.....	55	42	40	40	35	25-30	42	35	52½	45	55	55	45	35-37	37½
Windsor, Ont....	63	35-37	...	\$3.00d	...	30-35	3c yd.	35-40	60	47	63	...	47	...	37½

that in New York and Pittsburgh bricklayers are paid a higher rate than in any of the other cities quoted, while carpenters in New York City are paid more than they are elsewhere. When it comes to cement finishers Albany heads the list. Lathers are paid a higher rate in Detroit than in any of the other cities, while it divides honors with New York in regard to the rate paid for plasterers.

Comparing the figures in the accompanying table with the wages which prevailed two years ago in the various branches of the building trades it will be seen that many changes have been made, most of which are in the nature of advances.

Vicissitudes of house movers are numerous, but seldom do they have to contend with such a job as recently fell to the lot of a Jersey contractor. A forty-

preparing gratuitously estimates of cost suggests that the time has arrived when all concerned should take up and seriously consider the possibility of adopting a modern and more sensible system of estimating. In a recent address given before the General Contractors' Association of San Francisco, G. Alexander Wright, an architect by profession, but who has had the opportunity of closely studying the practice of estimating upon bills of quantities, or as it is more popularly termed the "Quantity System," offered some suggestions which were of unusual interest and value.

At the outset he advocated the creation of a standardized "American" System which above all things should be practical and in line with progressive building methods. It should be clear and accurate and stand for square dealing between contractor and owner; a progressive system free from the defects of other systems such as unnecessary "elaboration," and yet one that will reveal to the bidder at a glance the actual

quantity of material and labor in a structure in any individual trade.

When bidders are invited to submit bids they are theoretically asked, of course, to submit competitive prices, but in actual practice their bids are based upon competitive quantities before "competition in prices" commences, and which, in the opinion of the author, is as unjust to the contractor as it is ridiculous. The legitimate competition can only come in where one man can handle a job better than another, or one man may have some advantage over another. Any bidding outside of this kind of competition is legitimate enough, but it must be obvious that no amount of figuring can reduce the real quantity of material which a building will take. And so it is contended that it would be proper and fair to start all bidders figuring upon the same basis by furnishing each with a schedule or bill of quantities showing accurately and clearly the different quantities and kinds of materials upon which the bidder is invited to figure, and even then there would be plenty of competition left in placing profitable prices against each other.

The great difference we find in bids arises not so much in the prices or money values placed against the quantities as it does from errors in the "quantities" themselves, the accurate preparation of which calls for special training and continuous concentration of mind which the busy contractor of today can seldom find time to acquire.

Great Difference in Bids

A bill of quantities such as we are considering is first of all a document handed free of expense to each bidder, and containing everything which is essential for a contractor to know when making up a figure, with a separate section for each trade such as "Excavation," "Concrete," "Brick work," etc. A general summary is provided at the end of the bill in which is entered the net cost of each trade. This summary is footed up, the profit the bidder expects to make is added plus the cost of the quantities and the result the amount of the bid. Methods of measurement must conform to the standards used by each individual trade and through the bill the greatest care is taken to have everything systematized. Detail sketches also appear in the margins where necessary and show a bidder at a glance what is necessary, these being of more value to the estimator than long written descriptions one sometimes finds in specifications.

In general practice I believe the accuracy of the bill of "quantities" should be guaranteed and such a document might well be made the basis of the contract equally with the drawings and specifications. If this were done the chief cause of disputes between owner and contractor would be removed.

Some of the Advantages of the System

Some of the advantages of the quantity system of estimating to the contractor are as follows:

- First.—Saving of time and money.
- Second.—Greater precision in measuring.
- Third.—No uncertainty as to interpretation of plans and specification—the quantities should govern.
- Fourth.—No visits to the architect's office when figuring for explanations or otherwise.
- Fifth.—No other work is contracted for except the "quantity" set forth in the quantities.
- Sixth.—The contractor, if he so desires, can check up the quantities before signing a contract. In an American system of estimating the quantities should form part of the contract.
- Seventh.—No bidder can inadvertently leave out anything and so in this way arrive at too low a figure.
- Eighth.—Not having to spend time taking out his "quantities" the contractor has time to attend to more profitable business.
- Ninth.—Systematically arranged bills of quantities duly priced—whether work has been secured or not—form excellent data for making future estimates.

Before any universal American system could be put into operation it would be necessary first that a committee of representative contractors from each trade be selected to standardize a method of measurement to be universally followed by all architects, contractors and mechanics. Second: that competent men, mutually satisfactory to contractors and architects, be retained in such numbers as the volume of work may demand. These men could be placed under bond covering their competency and integrity until they have been assured. The compensation of these surveyors should be fixed at a certain percentage upon the total of each estimate, each bidder of course adding this amount to his bid.

A law should also be passed that a bill of quantities be furnished free of expense to bidders upon all state and public buildings.

I am hoping to shortly see a committee appointed in every Building Employers' Association in this country to take up and seriously consider such matters as I have discussed.

The "Monkey-Wrench Engineer"

They built a sawmill, some years back,
Acrost the way from Hackensack;
An' when they sought an engineer,
Hank Armstrong thought he'd volunteer.
Sez he, "I've ran a mow'n machine
An' grindstone sence I was thirteen,
An' sulky plow an' corn drill, too,"
They said they kinder guessed he'd do.

He filled that b'iler full's a tick
With water hauled from Slocum's Creek;
An' then he took that firebox
An' chucked it full of hemlock blocks.
He throwed in coal oil by the cup,
An' lit a match to start 'er up.
The flame shot out as he looked in
An' singed the whiskers off his chin.

That thingumbob that stands on top
Jumped open with an orful pop,
An' steam come shootin' in a cloud
Till Hank he said he kinder 'lowed
The thing was makin' such a noise
That it might rile the other boys.
An' so he twisted down the nut
Ontil the pesky thing stayed shut.

We never thought Hank knowed so much
'Bout b'ilers, injines, belts an' such.
Why, if a bearin' box got hot,
He'd just splash water on the spot
Ontil the place got cool, an' then
He'd start the whole shebang again.
Or, if a belt got slack an' slipped,
He'd smear on tar ontill she gripped.

Hank said he never worked by rule,
'Cause any sort of goldarned fool
Could use horse sense an' mend a piece
With monkey-wrench an' elbow grease.
Onct when the guvner shaft got bent,
He grabbed his monkey-wrench an' went
An' hit the dingus one good smack
Acrost the side an' bent it back.

An' regular, twelve times a week,
The b'iler jints 'ud spring a leak.
Then Hank 'ud jump up off his bench
An' grab that doggone monkey-wrench
An' go an' hammer every seam
Till it would quit its spittin' steam.
An' when we ast him, "Won't it bust?"
Hank grinned an' said, "In God we trust."

R. T. STROHM, in *Power*.

What will be Pittsburgh's most unique office building is the three-story brick and terra cotta structure which has just been designed by Architect C. W. Milligan for erection on a strip of land fronting 8 ft. in Smithfield Street and extending 86 ft. along Oliver Avenue. The ground floor will be devoted to stores and the upper floors to offices.

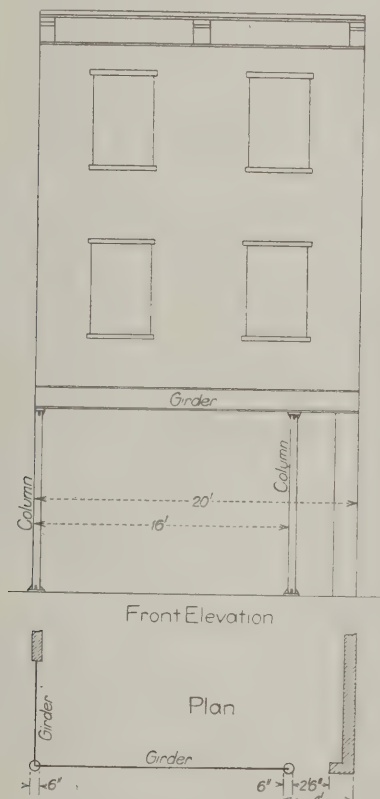
CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

Figuring Weight of Wall Supported by Girder

From C. S. L., Philadelphia, Pa.—I have been a subscriber to your paper for the last two years and have found it very profitable and most interesting on all subjects pertaining to building construction. It has been a great help to me in many ways and I cannot resist the statement that it is one of the best papers of which I have knowledge that can assist the members of the building fraternity.

Being interested in this line of work and especially in the tensile and compressive strength of materials I would like to have some of the practical readers of the Correspondence Department answer the following:



Figuring Weight of Wall Supported by Girder

What method is used and what figures to obtain the weight of wall which is to rest on a girder over a 16-ft. opening? This opening has been made in the corner of a private dwelling having a 20-ft. frontage and the alterations to the property are with a view to making a store out of the first floor; putting a large window on both front and side with an iron column to carry the weight of both girders for front and side wall over the openings.

I would say that it is a three-story house, each story being 9 ft. 6 in. in the clear and having two windows in each story, each being 3 ft. wide by 5 ft. high. The walls are 9 in. thick.

My object in asking this question is to find out what figures are used for the other materials independent of

the brickwork, such as window frames, window sills, window heads, weight of joist and rafters for roof.

How are the sizes of column and girders for carrying the above weight determined?

Answer.—In commenting on the above communication Ernest McCullough says: The accompanying sketches will doubtless assist the correspondent in obtaining the information he desires. He states that the front width is 20 ft. and the beam is to span a 16-ft. opening. From this I assume that close to the side wall is a doorway and at the side of this doorway he will place a column to carry one end of the beam, the other end resting on a column placed at the corner as shown in the plan view.

The load to be carried will be figured by taking the area of the wall to be supported by the girder and deducting from it the areas of the windows. Assuming the brick wall to weigh 112 lb. per cubic ft. we obtain the total contents by multiplying by 112. The window areas will be multiplied by 10 lbs. per sq. ft. and the result added to the wall weight.

This is for the front wall, which we assume is not a bearing wall. This is the load to be carried by the girder, but half will be carried by each end column.

For the girder on the other side proceed in the same manner for the wall weight, but to this must be added the weight of each floor carried on this wall and the weight of the roof with its load.

The roof live load will be figured at 25 lb. per sq. ft. and the live load on each floor at 40 lb. per sq. ft. It will be sufficiently close to allow 15 lb. per sq. ft. for the construction weight of each floor and the roof. For example, in this case the total live load per sq. ft. is 105 lb. and the total dead load per sq. ft. is 45 lb.

The correspondent has omitted to give the span of the girder at the side so the best we can do is to merely indicate the process. Multiply the width of the building by the span of the side girder. Multiply this by the total weight per sq. ft., which in this case is 150 lb., and divide by 2, for half the load will be carried by the other side wall. This is termed the reaction. Add the total weight of the wall to the reaction and the total load to be carried by the girder is obtained. Half is carried by the column at the wall end and the other half by the corner column. The corner column, therefore, carries half the load on each girder and must be proportioned accordingly. Tables for the strength of columns and girders are found in Arthur's "Contractors' and Builders' Handbook," also in the handbooks of various steel companies.

Variation in Cost of Construction

From J. F. E., Youngstown, Ohio.—I consider *The Building Age* a very valuable acquisition to any contractor and believe the series of plans and drawings you are now running will be of no little service to a great many of the subscribers. I have, however, one little kick to register: Your estimates in many cases are very far astray, at least for this locality. In connection with the cover design for the August issue—an eight-room house of Colonial design—the cost of

the items carpentry, millwork and lumber are given at \$1,455. Surely that is an error, for it is at least \$1,000 too low in this section.

Under which item is contractor's profit figured? It ought to be 10 per cent. of the entire total and should be shown as such.

Note.—Regarding the above question of cost, Arthur Weindorf, the author of the cover design for our August issue, offers the following in reply:

I would state that the contractor's profit is figured in with the entire estimate, 10 per cent. of the cost of each item, making the contractor's profit \$349.

In reference to the statement that the cost of this house is \$1,000 too low for Youngstown, Ohio, I would say that this is likely to be true as the exact cost of a house is governed very largely by local conditions. A house of this type may vary from 5 per cent. to 100 per cent. above the stated amount and in some parts of the country might cost even less than \$3,490. This difference is caused by the cost of labor and materials in the various localities.

The house was figured where labor and materials are low and where the cost of this type of house is 14 cents per cubic foot. This same building if estimated in New York City would come to \$6,500.

The carpentry work including lumber bill and millwork was figured on a 42 per cent. basis but this will vary according to the locality, materials and labor.

I would call the attention of the correspondent whose letter appears above to the article on page 635 of the December, 1912, issue of *The Building Age*, entitled "Cost of Building Construction in Various Localities."

Location of Billiard Room in a Dwelling

From H. M. S., Indianapolis, Ind.—Will readers who may be interested tell me where is the best place in a two-story modern home with cellar and attic to locate the billiard room? A billiard table is generally consigned either to the basement or to the attic, mainly, I believe, for lack of sufficient room elsewhere.

Given sufficient space on the second floor for a room opening on the second floor hall, common also to the bedrooms, bathroom, etc., what is the objection, if any, to utilizing this space for a den and billiard room?

Note.—With no desire to anticipate the interesting comment which we trust our readers will furnish we cannot refrain from a few words bearing upon the question raised by our correspondent. Local conditions and the preference of the owner of the house will largely determine where the billiard room shall be placed. One reason perhaps why it is often located in the basement is because a very firm and solid foundation for the table is provided, while at the same time it is sufficiently far removed from the living and sleeping quarters of the family to prevent them being annoyed by the noise of the players. Naturally during a game conversation is more or less animated and the click of the balls and the thump of the cues on the floor tend to render distinctly apparent to the occupants of the house the fact that a game of billiards is in progress. Still further, if the players are evenly matched the games are likely to extend far into the night when the rest of the family wish to sleep.

There would seem to be no reason why the billiard room should not be located upon the second floor if so desired, provided the room in which the table is placed is rendered sound-proof so far as may be possible and the floor made so solid and unyielding that the table will always maintain a true level.

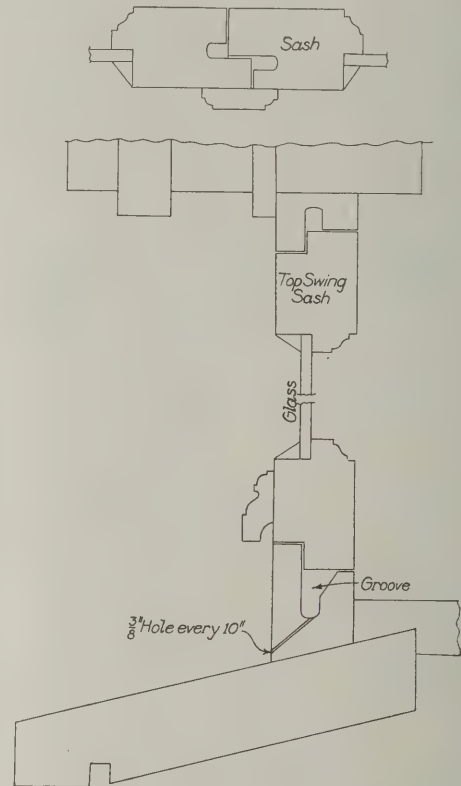
No doubt the reason that the table is placed either in the attic or the basement is because there is more room for it in these places and it is removed as far as possible from the sleeping quarters of the family.

The correspondent can readily understand that it

would be decidedly annoying to have the billiard room placed next to a sleeping room or located between two of them and the family attempting to sleep while an animated game was in progress unless the precautions noted were taken.

Construction of Casement Windows

From H. E. Talbot, Willoughby, Ohio.—Having read the discussion on casement windows which appeared on page 169 of the April issue of *The Building Age*, I am sending sketches of a device for keeping out water which I have found very satisfactory.



Construction of Casement Windows

The sketches so clearly indicate the construction that they practically speak for themselves.

The idea of this arrangement was given me some time ago by Architect C. W. Hopkinson, of Cleveland, Ohio.

Remodeling a Story and a Half Building

From D. P. Barry, Redford, N. Y.—If "F. T.," La Grangeville, N. Y., had stated in his letter in the August issue whether his house is timber frame or balloon construction it would simplify the answer somewhat. I have raised a number of such buildings: for example, my own house is 78 ft. long, one part being 38 ft. and the other 40 ft. long, frame buildings. I raised one part 4 ft. 4 in. and the other 7 ft. With three helpers I cut each part loose and raised it in a day.

If it is a timber frame building, enough of the cornice must be taken off to get at the pins to drive them out or bore them out. If there are any windows in the gables that are to be left, take off the gable frieze and pull or cut all the nails. If there are no windows in the gables take off a few clapboards from the under side of the plate across to the other; take off all the lath and plaster from the plate up and put ceiling joists in each gable with two or three between, according to the size of the building, and spike them firmly to the feet of the rafters and plate. Lay off the plates first and place them where they should be for lath.

Having pulled all the nails from the side studs set

three or four jacks under one plate and tighten to see if everything is loose; jack until the tenons are out of the plate; block up this side and anchor so it cannot go sideways or endways and put the jacks on the other side and jack up a foot.

If it is a wide building it may be jacked 18 in. at a time without changing sides. Keep the side anchored where you are not working. Stiff braces must be used for anchoring; short posts set in the mortises and resting on the posts well braced will support the plate while on the other side. Ripping need not be resorted to unless going up a good ways.

When sufficiently raised put a piece of 2-in. material the right hight on the outside of the tenon and outside of the mortise, then plumb and nail it in place.

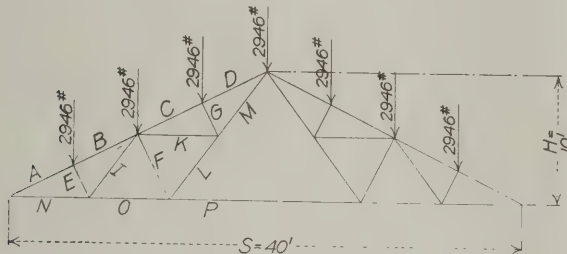


Fig. 1—Strain Diagram of Truss

Put another piece on top of the tenon and in the mortise of the plate and spike; another inside the tenon completes the post. Put in studs the full width of the plate from plate to floor.

If the building is of balloon frame cut it off below the side cornice all around and proceed as before. If the building is light much of the jacking can be done with hand spikes. The roof need not be racked in the least; where studs are cut fill in and lap a piece over joints.

The building will be entirely stable and there is no risk; only care should be given to the anchoring so it will come up plumb and be safe from a sudden wind.

The main part of my house is 28 x 38 ft., with 1 3/4-in. boarding and heavy frame, and shortly after the roof had been raised a heavy storm broke a severe drought, but the tacking up of a few boards kept the rain out and the roof did not even shake.

Roof Truss for a Wagon Shed

From Paul T. Leshner, Harrisburg, Pa.—In answer to the inquiry of "C. C. H.," Brookville, Pa., in a late issue of the paper, I have drawn and submit herewith a truss for a wagon shed which I hope will be suitable for his purpose. The trusses will be 1/4 pitch, 40 ft. span, calculated for 12 ft. centers, built of 2 x 8-in. timbers and wrought-iron rods, the shed to be covered with a slate roof resting on 1 1/4 in. tongued and grooved sheathing.

Each truss is figured for a load of 44 lb. per sq. ft. of roof area, which consists of the following items:

	Lb. per sq. ft.
Wind	18
Snow	12
Slate	6
Sheathing	3
Truss and purlins	5
Total load	44

The distance between panel points is 5 ft. 7 in., so that the load coming at one panel point will be 5.58 ft. x 12 ft. x 44 lb., which equals 2946 lb., as in Fig. 1.

As this is an eight panel Fink truss and all the panel loads are equal the stresses in the different members can readily be found by the use of the table in Fig. 3.

In order to find the stress in any member, multiply

Member	Kind of Stress	Factor when S=4	Amount of Stress in Pounds	Size of Member
A	Compression	7.83	23,067	2-2"x8"
B	"	7.38	21,741	2-2"x8"
C	"	6.93	20,416	2-2"x8"
D	"	6.48	19,090	2-2"x8"
E	"	0.89	2,622	1-2"x8"
F	"	1.79	5,273	1-2"x8"
G	"	0.89	2,622	1-2"x8"
H	Tension	1.00	2,946	1" dia. Rod
I	"	1.00	2,946	1" " "
J	"	2.00	5,692	1 1/2" " "
K	"	3.00	8,838	1 1/2" " "
L	"	7.00	20,622	1 1/2" " "
M	"	6.00	17,676	1 1/2" " "
N	"	4.00	11,784	1 1/2" " "

Fig. 3—Table for Finding Stresses in Truss

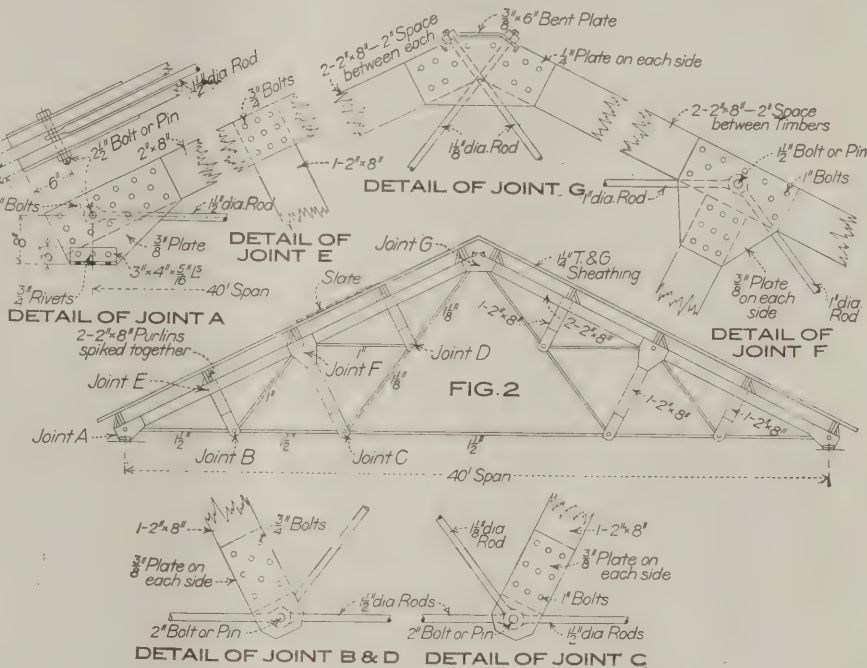


Fig. 2—Elevation of Truss with Details of the Various Joints

Roof Truss for a Wagon Shed—Contributed by Paul T. Leshner

its factor in the table by the panel load, which in this case is 2946 lb. Now, knowing the amount and character of the stress in each member, the size of the members and the detail of the joints can readily be determined by the rules for strength of materials—the sizes thus determined being shown in Fig. 2.

The purlins will consist of two 2 x 8-in. planks spiked together. In many trusses of this type castings are used at the joints for the rod connections, but by the use of plates the writer thinks a more economical truss can be built.

Problem in Hand Railing

From C. F. S., Brooklyn, N. Y.—The solution to a "Problem in Hand Railing," by Morris Williams, which appeared in the August issue of the paper, contained in its closing stages such reference to my earlier solution of the problem as to cause me to offer additional explanation.

Referring to my diagram in the June issue which

was submitted in reply to the query of "A. E. K.," the aforementioned writer first takes exception to the expediency of the method. He terms it strange and perplexing; declares that the query called for something different and hopes that the method he himself has submitted will better answer that call. May I ask here whether all methods are not equally strange to a beginner, also what is likely to cause perplexity more than presenting to a learner too much at one time?

"For what purpose," it is asked, "does 'C. F. S.' in his diagram show the flights turning to the left?" The answer to this is too apparent to need explanation.

Again, "Why does he develop the upper plan tangent instead of the bottom one as do all hand railers?"

I answer, Because a good reason existed for so doing. Was not my manner of finding the bevel, about which Morris Williams is strangely silent, also very unusual? Is the finding of it in cramped up corners likely to give the greatest accuracy? Is there no advantage in this over the prevailing methods? Will it neither be allowed that the direct finding of the major axis with the positions of the foci—the most difficult of all operations seen in other prevailing methods—will this neither be admitted as of any advantage?

The following question, however, deserves some consideration. "Why," he asks, "violate all precedent since the time of Peter Nicholson in daring to drop his rail $1\frac{1}{2}$ in. below the point 3? This point should be sacredly considered as a fixed point."

My answer follows: First of all I desired to make my diagram possess a symmetry of arrangement which is sometimes deemed essential for purposes of instruction; also the lines were left out when it was thought they would obscure the principal operation. My aim was not to distract the querist "A. E. K." with too much detail; not to sacrifice everything for the best disposition of the tangents but to aid him where probably he most needed aid with a clear and concise method of finding his face mold.

If I failed the fault is not altogether mine. The diagram in the June issue was not an exact reproduction of the one I sent for publication. A careful reader should have noticed that reference was made to the level line F-D but that no such line was shown in the diagram. This was because the letter "F" had been misplaced and put upon the line "A-B." Consequently the line R-F and others were out of place. This concludes my explanation in regard to my effort to be of benefit to the correspondent "A. E. K."

Now I wish to dwell a moment on the solution of the problem as presented by Morris Williams. Keeping in mind the fact that his diagrams and explanatory text are offered with a view to helping a beginner, I find a contradiction between the measurements furnished by the given "scale" and those indicated in the diagrams. I won't ask him to explain this; but what I would like to know is why, in giving an example like Fig. 5, it should not have been thought necessary to inform "A. E. K." that some authorities insist that the rail shall manifest, if nothing more, some desire to follow the stair; that is, if he were to follow the example in practice he might later find himself faced with a more serious problem, namely, that of altering the stair to fit the rail.

Now, why does the rail in Fig. 5 vary in height above the steps a distance of more than 12 in.? Is it not because of its being the only way to respect the fixed point, unless the top springing riser be moved back? If this fact be admitted, which indeed it must be, why, then, was not point 5 of Fig. 1 worthy of a similar safeguard? Raising the under side of the rail to rest on the steps as shown in Fig. 1 deceives, by only pretending to respect it.

Since the steps of the top flight are all equal a perfectly straight rail would pass through the point 5.

Therefore any easing must sink below it. Thus for a second time, at least, since Peter Nicholson's day has all precedent barely escaped violation and the problem of "A. E. K.," if it required a solution that should satisfy everybody still remains something of a problem.

Note.—In tracing our correspondent's diagram for engraving the draftsman inadvertently placed the letter "F" and the bevel on the level line A-B instead of putting it on the level line immediately above it. The diagram of "C. F. S." as he originally submitted it was in conformity with his descriptive text and we greatly regret the error in engraving it.

Practical Value of "The Building Age"

From Neil Brown, Port Chester, N. Y.—I am a carpenter and builder by trade and have been a subscriber to the paper since 1888, having every copy of your valuable journal in my home since that time up to July, 1913, and I would not be without it. I am pleased to say that as a trade paper it has no equal and should have a larger circulation among the young mechanics. I find, however, that the trouble is that most of them do not know that there is such a magazine published. I have always encouraged young men working with me to take the paper and I find that those who take it very seldom go back on it. I could name several of them who to-day hold responsible positions in the building trade throughout this country and Canada.

Now the ideas among the advertisements alone are worth the money, not to mention that the very best mechanics in the country take pleasure in writing to the paper every month, putting before the public the experiences of years of study and labor. The paper cannot be too highly recommended for that alone, to say nothing of the useful information which is gathered from all over the world.

I wish you success and hope you will find a way to reach the young mechanics of this country with your most valuable magazine.

Note.—Judging by the great number of letters received from readers of *The Building Age* of a character similar to the above, there are no doubt thousands who will agree with Mr. Brown that every young man entering the building line should have and should carefully read *The Building Age*.

Every mail brings us from the practical readers a list of those whom they believe will be interested in and profit by the reading of this publication.

We heartily appreciate this kindness and good fellowship, and in this connection hope our readers will keep in mind the suggestion of Mr. Brown with regard to the young men of the country.

Construction of Concrete Coal Bins

From Engineer, Illinois.—I am inclined to the opinion that "U. S. E.," Boston, Mass., who asked about the construction of concrete coal bins in the August issue of the paper, does not fully realize the importance of his problem. He is up against a proposition where there must be such detail in making a proper reply that it would require more space than could be given to it in the columns of the paper and he should employ a competent reinforced concrete designer to do his designing for him. A man who can afford to erect such an expensive structure as he describes certainly has money enough to employ a competent engineer to design the work. I would add that the designing of bin walls is one of the most particular and complicated problems in reinforced concrete design that there is—second in this particular only to arches.

The correspondent wants the walls to be 18 in. thick and the roof must carry a cart, two horses and a ton

of coal in one place, his side walls to be of lean concrete—not reinforced—and the roof slab to be reinforced. I would say that his walls are altogether too thin and the concrete too lean for the height.

A Detailed Method for Roof Framing

From George H. Wilson, Denver, Col.—Replying to the inquiry of "W. S. B.," Colorado Springs, Colo., in the May issue of the paper, I show herewith a graphic method for laying out all valley and jack rafters, obtaining all bevels and backing of valleys for the roof. While the figures given of the various lengths may not be absolutely correct, as to do this they should be obtained by the extraction of square root, the figures are near enough for all practical purposes and are to be found on our rules and squares. My article in a previous issue of *The Building Age* gives a descriptive method for laying out a roof of equal pitch. The roof here shown is equally simple to

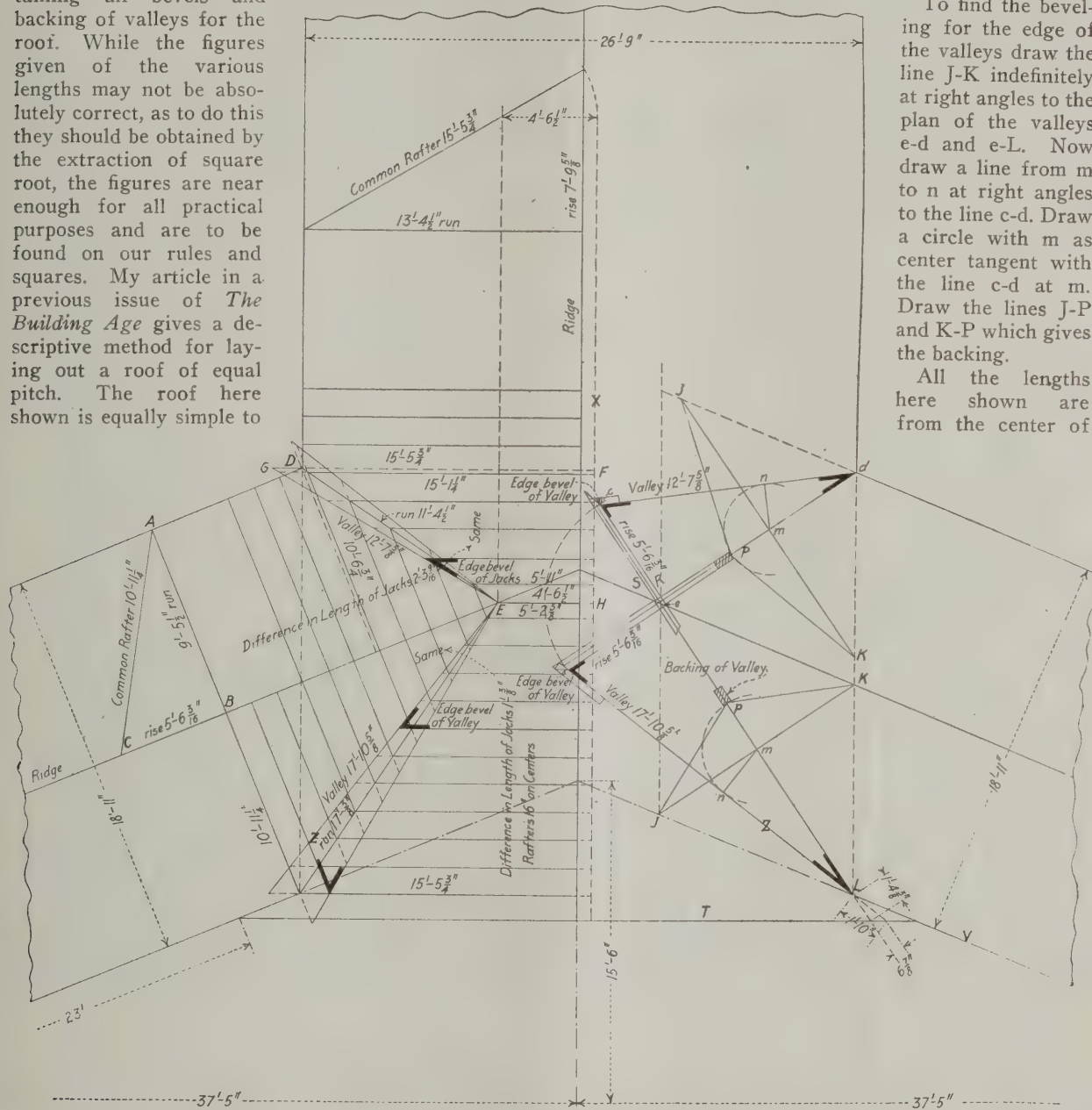
ridge line to c. Lay out the same thickness on the outside of the line c-d and then draw the angles.

To find the lengths and edge bevel of the jack rafters extend the common rafter F-G from the line X, which is the stretchout of the jack rafter at the intersection of the valleys. Now draw the stretchout of the valley from E to G, after which extend the jack rafters to the line E-G, which gives the correct length of each; also the difference in length and the edge bevels.

Repeat this process for the lengths and bevels of the valley and jack rafters on the opposite side of the ridge.

To find the beveling for the edge of the valleys draw the line J-K indefinitely at right angles to the plan of the valleys e-d and e-L. Now draw a line from m to n at right angles to the line c-d. Draw a circle with m as center tangent with the line c-d at m. Draw the lines J-P and K-P which gives the backing.

All the lengths here shown are from the center of



A Detailed Method of Roof Framing—Diagram Accompanying Letter of Mr. Wilson

lay out by this method, with no rules to remember as by the steel square.

The pitch of the roof is 7 in. rise to 12 in. run. Referring to the accompanying diagram, A-B is the run on the left and right wings; the rise is 5 ft. $6\frac{5}{24}$ in., or near enough to call it 5 ft. $6\frac{3}{16}$ in.; the length of the common rafter is 10 ft. $11\frac{1}{4}$ in.

To obtain the length of the valley rafter D-E, and which is represented in the diagram at the right by d-e, erect the rise 5 ft. 6 3/16 in. square from the plan of the valley to c. Then c-d gives the length.

To get the edge bevel, lay out the thickness of the valley on the plan—any thickness will do—and from this erect perpendiculars R-S from each side on the

the ridge to the center of the valleys of the roof.

It should be noted that at the foot of the valley Z the wall plate T will be $6\frac{7}{8}$ in. lower than the wall plate V. The run of the valley and the length on the back from the intersecting points at L to the wall plate T are here shown.

How Can I Prevent the Stucco from Cracking

From C. C. S., Schenectady, N. Y.—I am contemplating the erection of a stucco bungalow, the foundations of which are to be built of field stone 18 in. thick and to extend 30 in. below the grade line. I desire to run the stucco from the cornice to within 4 in. of the grade,

which will make 26 in. of stucco work from the sill on to the cobblestone foundation. My query is, What is the best method of construction on this part of the work?

I am advised by local contractors that the only way to do this work is to wooden plug the foundations and wire lath over the cobbles, stapling to these plugs, but that I am almost sure of getting cracks in my stucco work when the building and foundations settle. Others contend that I should apply the stucco directly to cobblestones and wire lath to the sill. This also makes cracks likely at the joining point of the sill and foundation. Any suggestions or advice which the practical readers of the paper may give me on this work will be greatly appreciated.

Building on the Percentage Basis

From E. M., Chicago, Ill.—The percentage charged for work done on a percentage basis is seldom less than 10 and often runs as high as 15 per cent. Whether this is charged only for the labor or on the gross cost of the building depends upon the agreement entered into for the work. If the owner takes charge of the purchase of all supplies the contractor, who in such case is really only a skilled superintendent, gets a percentage only on the labor, plus a certain agreed sum for advising upon purchases. Usually, however, the contractor (superintendent) has to attend to everything precisely as if he were a lump-sum contractor, and his percentage is paid on the cost of all material and labor.

If more than 10 per cent. is paid it is because the contractor furnishes tools and machinery, the additional percentage in this case being in lieu of rent. The owner, however, pays for all repairs and maintenance and this, being part of the cost, is something on which the superintendent obtains a percentage.

The percentage system is a present-day craze which will not last very long. It is a wasteful method, for the contractor has no incentive to save money; the architect, or engineer, whatever the designer may be, is seldom considered after the contract is awarded, for the owner and contractor confer directly with each other. There is thus no independent arbiter between the contractor and owner. Good work is, of course, done if the owner wisely selected his superintendent, but it is always high-priced work. The owner does not escape "extras," for he must pay for everything, but the one advantage, for which many owners are willing to pay, is that changes and alterations are made as the work progresses without friction or danger of lawsuit. Otherwise it is a bad system.

Construction of Elevated Water Tank

From F. J. H., Waukegan, Ill.—Will some of the practical readers help me out on the following proposition: I have been asked to erect a wooden tower 45 ft. high to support a wooden water tank 16 ft. in diameter and 16 ft. deep. We have quite a lot of 10 x 10 yellow pine timbers on the premises and it is desired to use these. By splicing, etc., they could be made long enough for posts.

Assume the weight of the tank, water, roof, floor system, walkway, railing, etc., to equal 200,000 lb., how many posts will it be best to use?

What batter should I give them, and what would be considered the best arrangement of posts, girts, braces, etc.?

It would be interesting to many of the readers if some of the technical readers would show how to figure out the sizes of timber required on a job of this kind.

Caucasian beech is noted for its good quality and is suitable for the manufacture of furniture, casks, etc.

Some Features of New York's Latest "Model" Tenements

The model tenements consisting of two five-story buildings of odd design and connected by a two-story link which have just been completed in West 44th street, between Ninth and Tenth avenues, New York City, embrace many unusual features. The buildings, which were designed by Architect Grosvenor Atterbury, have a combined front of 50 ft. and include two units—a front and a rear building, each 29 ft. deep with extra large courts—in fact, 50 per cent. larger than are required by law—between them. Both units are of brick with steel beams reinforced by concrete floor construction and have a tile roof. The buildings have marble halls and double marble staircases leading from a common wide entrance. All the inside wood trim is semi-hardwood in natural finish with hardwood floors except in the halls and bathrooms. The apartments are lighted by electricity, have gas range and steam heat as well as other modern conveniences heretofore utterly unknown in that district.

In the cellar is a special incinerating plant for garbage and the heat produced in this process of garbage incineration is directed as an economic by-product to heating water for the tenants. The second floor of the connecting link between the front and rear buildings serves the purpose of a common assembly or reading room for the tenants with large skylights and windows and built-in seats and bookcases. On the ground floor of the connecting link as well as in the basement are two perambulator rooms for the baby carriages of the tenants and on the roof, in addition to the space for drying laundry work, is a children's playground properly protected.

Every one in the neighborhood who was asked in regard to the matter when the buildings were about finished, had heard that no one would be admitted as a tenant unless there was at least one child in the family and that no family would be taken whose weekly income exceeded \$25; also that a careful system of investigation of the personal history and character of all applicants was enforced which made the process of application for apartments in the new building "a regular civil service to get in." The buildings were erected by Mrs. Catherine C. D. Rogers, of New York City.

How to Avoid Disastrous Fires in Buildings

According to former Fire Chief Edward F. Croker, of New York City, the only way to prevent such a fire as that which lately occurred at Binghamton, N. Y., with such disastrous results, is to erect fireproof buildings. He would have a committee of firemen draft a law regulating building of factories; double the force of building inspectors and see that the law is enforced; have bridges connect all high buildings in the rear at every floor; order tower fire escapes independent of the main building on every factory and take fire investigations out of politics and see that only practical experts be appointed.

According to the Department of Agriculture the losses by fire on the national forests for the calendar year 1912 were the lowest of recent years; less than one acre to every thousand of timbered lands were burned over and the total damage is estimated at \$75,290, or less than \$1 to every 2,000 acres of area. This good record is attributed, first, to favorable weather conditions in most localities and, second, to the increased efficiency of the fire fighting organization.

According to reports from North Dakota nineteen new school buildings have just been planned for erection in various parts of the state.

SHINGLED BUNGALOW OF SYMMETRICAL DESIGN

A House Having Its Exterior Treated in Harmony with Its Leafy Setting—
The Cobblestone Chimney Used with Good Effect

A PLEASING feature of the bungalow design is that a visitor, upon entering the house, is usually surprised at the spacious interior, and the dwelling here described is a case in point. In viewing the house from the outside the observer would not suspect that there was space on the second floor for three bedrooms, a balcony, bathroom and plenty of closet space, or that the entrance from the porch on the first floor would lead into the spacious living room 12 ft. 9 in. by 20 ft. 6 in. This effect is accomplished by the long, low-pitched roof line, which causes the house to nestle into the landscape as a cosy little dove-cote, when in reality it presents ample accommodations for a small family and servant.

The roof in question has just enough pitch to care for the rain and snows of the central Atlantic climate.

by windows on three sides, one of these windows also lighting the stairs leading to the second floor. Opening from the stair landing is a small clothes closet.

An archway connects the living room and the dining room, with its large baywindow and cushioned seats. A door in the rear of the dining room leads out on to a screened dining porch, while a butler's pantry connects the dining room with the kitchen. The latter is provided with a large pantry wherein the refrigerator is placed. The kitchen has a Richardson & Boynton Co. No. 448 "Perfect" range, connected with a 30-gal. galvanized-iron hot water boiler. The sink, 18 x 30 in. in size, is of enameled iron with cast-iron lens and wooden dripboard. The servant's room adjoins the kitchen and out of it is the toilet.

Three bedrooms, bathroom and a large linen closet



A Shingled Bungalow of Symmetrical Design—The Cobblestone Chimney a Feature

In the semi-tropical climates of Southern California and Florida, where the snow problem is eliminated, this pitch can be reduced even more.

The New England farmer bemoaned the presence of the cobblestones on his farm until the bungalow man came along. The latter pounced on these stones like a chicken on a grasshopper and proceeded to work them into cobblestone chimneys and porch columns to heighten the picturesque effect of his low-pitched roof. The outside chimney, constructed as shown in the illustration, saves space in the interior of the house, and the built-in fireplace is fully as attractive as its more prominent competitor. The shingled exterior walls are thrown into pleasing contrast with the light trim.

The porch is 8 ft. wide and extends across the entire front of the house. A door leads from the porch directly into the large living room, which is well lighted

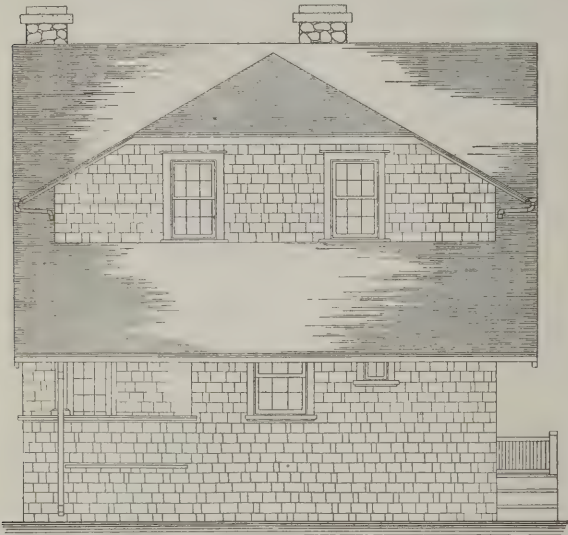
are features of the second floor. The bathroom is provided with a Standard Sanitary Mfg. Co.'s 5-ft. bath tub, with nickel-plated fittings, a 22-in. china lavatory and a syphon jet closet. An enameled medicine cabinet is placed above the lavatory.

The stone footings were laid 12 in. deep and are 12 in. wider than the surmounting stone walls. The stones were laid in their natural bed and pointed inside and outside with cement mortar. The walls and piers above grade, as well as the exposed parts of fireplace and chimney, are of selected field stones. The walls are laid in cement mortar. The door and window sills are formed of cement, 5 in. thick, and have a wash on top to shed the water.

The fireplace in the living room is built of selected field stone, with a back lining and back hearth of fire brick, a front hearth of red cement marked off in

squares, and provided with an H. W. Covert Co. damper. A spring trimmer arch is used for the hearth, and the ash pit is provided with an iron grate and door. The chimneys, where not exposed, are built of brick, and a 5-in. cement cap is used to crown the stone work. All flues are lined with terra cotta. The flue for the fireplace is 9 x 13 in., and that for the boiler and kitchen 9 x 9 in.

All concrete is composed of one part Portland cement, two parts sharp sand, and five parts broken stone.



Shingle Bungalow of Symmetrical Design—Rear Elevation—Scale, $\frac{1}{8}$ In. to the Foot

The cellar floor is laid with concrete 4 in. thick. After being leveled it was finished on top with 1 in. of cement mortar, made of one part sand and one part Portland cement.

All walls, ceilings, soffits of stairs and partitions on the first and second floors are lathed and plastered with three coat work—a scratch and a brown coat, composed of pure well-slaked lime, clean sharp sand and the best cattle or goat hair, the hair being well heated and soaked in water. The brown coat is floated down to a smooth even finish. The third or finishing coat is a hard plaster-of-Paris finish, smooth on the ceiling and sand finish on the walls.

The first and second floor joists are 2 in. x 10 in., placed 16 in. on centers; the roof rafters are 2 in. x 6 in., placed 2 ft. on centers; the studs are 2 in. x 4 in., placed 16 in. on centers; the porch floor joists are 2 in. x 6 in., placed 2 ft. on centers; the sill is 4 in. x 6 in.; the girder is 6 in. x 8 in.; the corner posts are 4 in. x 6 in.; the ceiling timbers are 2 in. x 4 in., and the bridging is 2 in. x 2 in.

The first floor joists are set in a 4 x 6-in. sill, while the second floor joists rest on the wall ribbon and sill. The floor joists are doubled under all partitions, running the same way and all headers and trimmers are doubled. The girders in the basement are constructed by spiking together three 2 x 8-in. joists, overlapping the joists. The rafters are supported from the plate. The plates are doubled over all openings and the floor beams are cross-bridged with 2 x 2-in. strips placed 8 ft. on centers. One layer of sheathing and double ply deadening quilt is laid over the rough first floor. The

overhang of the second floor over the porch is also deafened with scrapings of plaster, concrete, etc. The rough flooring is of hemlock, surfaced one side and laid diagonally.

The sheathing on the roof (except overhang) is of $\frac{7}{8}$ x 2-in. spruce boards spaced 5½ in. on centers. The side walls including dormers are covered with $\frac{7}{8}$ x 10-in. hemlock sheathing, surfaced on one side and applied diagonally. All outside finish, including window trim, verge boards, etc., is of white pine. The gable is formed with a $\frac{7}{8}$ x 6-in. beam, finished at the shingles with a small mold, and the overhang of the roof is sheathed with $\frac{7}{8}$ x 5½-in. double-beaded North Carolina pine. Shingles are of 18-in. first-quality red cedar laid 5 in. to the weather on the roof and 6 in. to the weather on the sides. They are started with two butts and an open valley is made at the dormers.

The porch floor is constructed of 1½ x 5½-in. North Carolina pine. The ceiling is made of $\frac{7}{8}$ x 5½-in. double-beaded N. C. pine finished with a $\frac{7}{8}$ x 6-in. fascia and a small mold. The outside steps have $\frac{7}{8}$ -in. platform and 1½ x 12-in. tread.

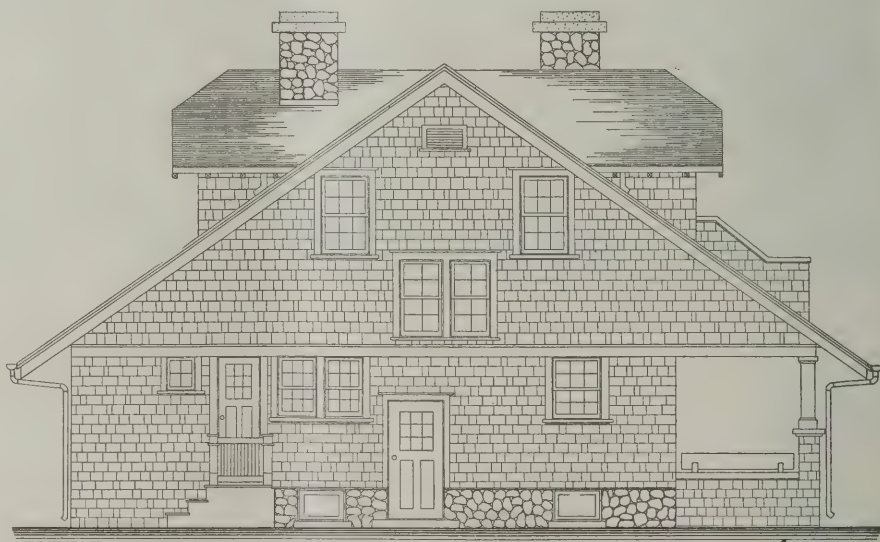
The interior trim in the living and dining room is of chestnut, that in the kitchen and passage of cypress, and all other interior trim of white wood. The side and head casings are of $\frac{7}{8}$ x 4½-in. stock. The dining room is provided with a plate rail.

All interior doors are 1⅜ in. thick, with five cross panels and birch veneer. The rear and outside kitchen doors are of cypress, 1¾ in. thick. The front entrance door is of 2-in. oak, and a double acting door is hung between the pantry and dining room.

The floors in the living and dining room are finished with $\frac{7}{8}$ x 2½-in. first quality oak; all other floors in the first and second stories are of $\frac{7}{8}$ x 3-in. comb-grained pine.

The house is heated by a hot-air furnace made by the Richardson & Boynton Co., 31 West 31st street, New York City.

All paint is mixed with Atlantic Paint Co.'s pure white lead and linseed oil and all colors and stains are of Devoe-Reynolds Co. brand. Varnish and filler are of the Pratt & Lambert make. The shingles are dipped



Side Elevation—Scale, $\frac{1}{8}$ In. to the Foot

with Samuel Cabot's creosote stain. Outside doors, casement, sash, porch floors and all other outside trim receive two coats of white lead and linseed oil. Leaders and gutters are given two coats of metallic paint. Ceilings are treated with two coats of varnish. The living room and dining room receive two coats of stain over the filler, rubbed to a polished finish; the kitchen and passage, two coats of stain over filler coats; all chambers and the bathroom, one filler coat and two

coats of white, rubbed to a dull white finish. The floors of the living and dining rooms are varnished and waxed with S. C. Johnson & Son's floor wax, well rubbed to a polished finish. The outside front door is finished with one filler coat and two coats of spar varnish.

This house was designed by Philip Resnyk, head of

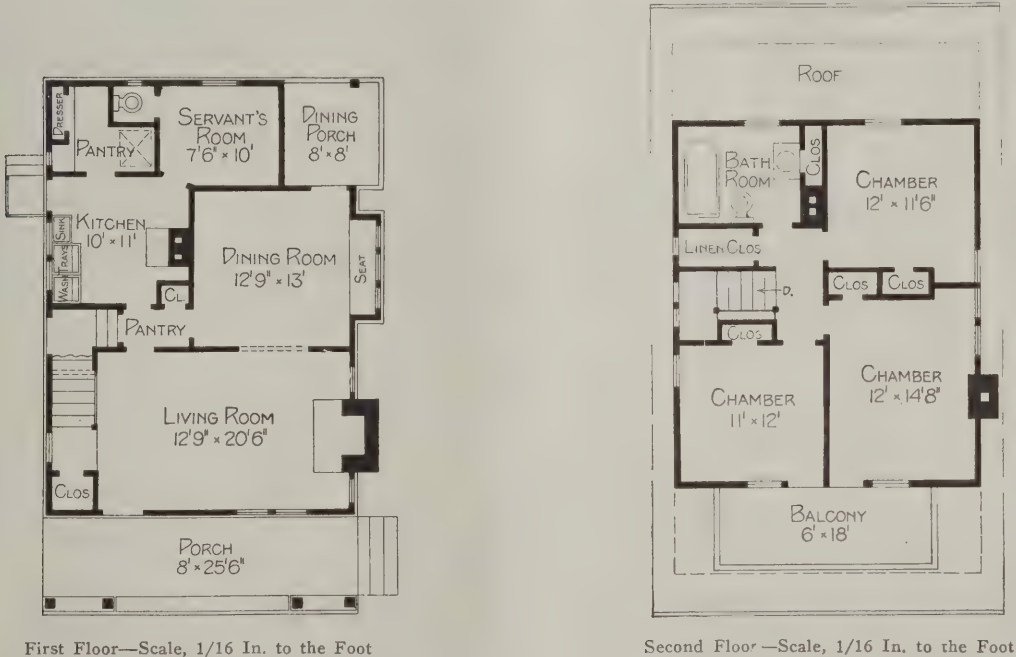
The Merits of the Concrete House

A well-known builder of San Francisco expresses the following opinion of the concrete house:

"The all-concrete residence can compete with frame or brick as to first cost, and furthermore it is absolutely fireproof; it is everlasting, and it is the only com-



The View from the Street Showing the Picturesque Surroundings, with the Rustic Steps Leading Up from the Drive



First Floor—Scale, 1/16 In. to the Foot

Second Floor—Scale, 1/16 In. to the Foot

A Shingled Bungalow of Symmetrical Design—Floor Plans and Street View

the architectural department of the Country Home League, New York City, and erected by that company for H. D. Bowie, at Mahwah, N. J.

Pencil manufacturers are said to be buying up old red cedar fence rails, in Tennessee and southward, to be made into lead pencils.

pletely sanitary habitation yet devised for man; its steel reinforcement and monolithic construction make it best adapted to withstand earthquake strain and shock; its great weight in addition to its monolithic-steel construction makes it proof against flood and tornado; it fulfills every requirement that could possibly be asked for in a home, and it is the ideal building par excellence."

SETTLEMENT OF CHICAGO'S BUILDING STRIKE

Adjustment of the Jurisdictional Grievances Which for Several Weeks Paralyzed the Building Industry of the City Named



THE difficulties recently existing between the Building Construction Employers Association and the Building Trades Council of Chicago have been amicably adjusted and thousands of men who for several weeks had been idle returned to work on July 21. The trouble was jurisdictional rather than that of a question of wages, and according to the agreement which has been reached the various classes of work will be performed as follows:

The structural iron workers are to handle the pipe beams and columns and set same in place in the building. As, however, these columns and beams are filled with concrete, it is necessary that the building laborers handle the beams and columns up to the point where they are ready to be delivered to the steel erector with the concrete filling all set ready for use. It is the general practice, however, to fill only beams before erection, and, except in specific cases, to fill the columns after they are in place in the building. The laborers, therefore, are to fill the columns after erection or before, as desired by the contractor.

In some cases it is necessary to use standard steel shape members in connection with tubular steel, and all such standard steel shape members are to be handled and put in place by the structural iron workers.

The structural iron workers are also to set all braces and tie rods made necessary by the building plans for the suspension steel concrete system.

Work of Building Laborers

Work to be done by building laborers:

Filling of pipe beams and columns with concrete either before or after they have been put in place. Beams are usually filled before erection; columns can be filled either before or after being put in place. All pipe beams and columns shall be handled by building laborers before erection because of the necessity of filling with concrete.

Building laborers shall put in place all floor and roof re-enforcing wires of the suspension steel concrete system ready for stretching and tightening.

Building laborers shall place all re-enforcing rods in floors and roof.

Building laborers shall erect and remove all scaffolding.

As to Work of Lathers

Work to be done by lathers:

Lathers shall place all metal lath, whether the same be used for floors, roofs, ceiling or partition.

Wherever channels are required for use in connection with ceiling work and are to be attached to the lower portions of the continuous re-enforcing wires, these channels are to be attached in position by the lathers.

Wherever furring is required in ceiling work, in addition to the support furnished by the lower portion of the re-enforcing wires, the lather is to place such furring in position.

The lather shall place all wire rod hangers necessary to support the ceiling, whether the ceiling is

formed by the under portion of the continuous re-enforcing wire or whether it is a special form of suspended ceiling.

Lathers shall place all partition rods and all furring used in connection therewith.

Other Details Settled

Concrete work:

All concrete slab work to be done by laborers and cement finishers in the usual manner.

The stretching and tightening of the re-enforcing and ceiling wires over, around and under the structural members, whether the same be pipe beams or shaped steel, shall be done by lathers and iron workers in equal number.

Jurisdictional claim of the ornamental iron setters and electrical fixtures workers in reference to the erection of ornamental and monumental bronze fixtures decided as follows:

"That all ornamental and monumental iron and bronze lamp standards which are a part of ornamental iron and bronze contract and manufactured by members of the Iron League of Chicago, or by manufacturers engaged in a similar line of business, shall be erected solely by members of the Architectural Iron Workers' Union, as has always been the custom."

Jurisdictional dispute between structural iron workers and lathers over light iron construction decided:

"Agreed that no cessation of work shall take place pending a decision to be rendered on the question by the executive board of the building trades department, July 21, 1913, such decision to be final and binding."

In regard to the claims of the hoisting engineers for the use of maintenance men, it was decided that the question be referred to the arbitration committee of the employers and employees.

That the agreement between the carpenters and the glaziers respecting the placing of glass, also the one between the sheet metal employers and glaziers of the same nature, be adhered to.

Sheet Metal "Form" Work

Sheet metal form work claimed by the carpenters and sheet metal workers is decided as follows: "That sheet metal workers are conceded the work of setting in position, tamping or bolting all sheet metal forms used in concrete construction, the carpenters to brace and line said forms."

That the jurisdictional dispute between the carpenters and sheet metal workers over the erection of interior metal trim be referred to the proposed joint arbitration board to be formed by the joint conference committee for immediate action.

That the joint conference committee concur in the proposition incorporating conditions and an increase of wages of 25 cents for marble setters per day and 15 cents per day for helpers, effective October 1, 1913.

One of the historic buildings in the city of Providence, R. I., is about being razed to give way to the onward march of progress. This is the Mansion House at the corner of Benefit and North Court streets, which was originally known as the "Golden Ball Inn." It was built in 1783 and for many years was the scene of the social activity of Providence, ranking among the best hostleries of New England.

Courses of Instruction in Carpentry and Building

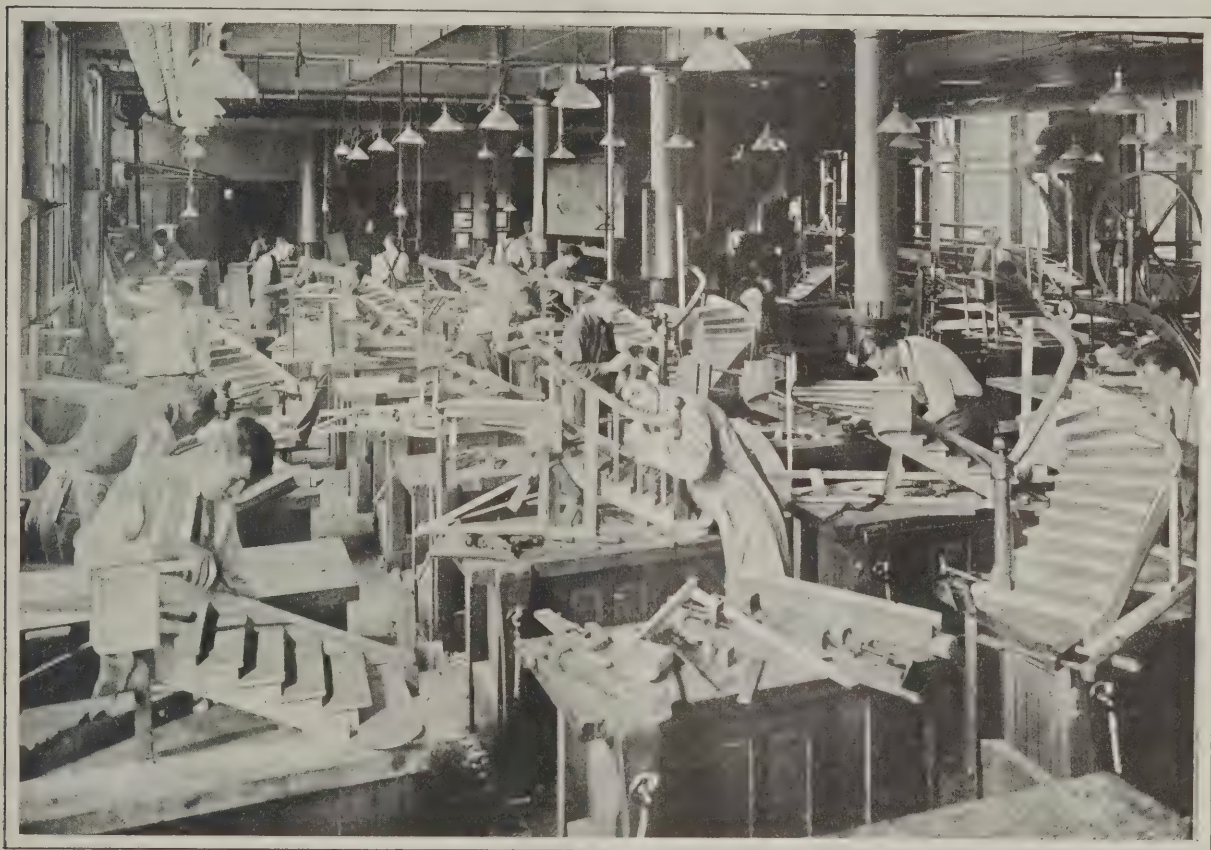
The opportunity for young men to improve their knowledge of building construction is strikingly demonstrated in the numbers which annually enrol in the classes of the trade and technical schools giving attention to the various branches of this important industry. The students are representative of a wide range of territory and upon completing their course of instruction go out into the world as active units in the particular line which they have selected as a means of livelihood. In the connection indicated there are many interesting particulars to be found in the Circular of Information just issued covering the day courses of the School of Science and Technology of Pratt Institute, Brooklyn, N. Y. Regarding the one year day trade course in carpentry and building it is interesting to note that the course is planned to furnish in a shorter time and more

have taken these courses in past years have obtained good positions and with rare exceptions have advanced rapidly in their work.

An English Building Trade Custom

According to a recent decision rendered by the judge of a county court in England it is customary to pay a foreman bricklayer for the time that he is away from his job on account of illness. This point was raised before the judge and he decided in favor of the bricklayer against the builder.

It appears that the plaintiff in the suit was engaged as a foreman bricklayer at a stated sum per week and on a Saturday was taken ill. On the Monday following he sent a doctor's certificate showing that he was



Courses of Instruction in Carpentry and Building—View Showing Pupils in Class in Stairbuilding at Work

efficient way the training formerly offered by the old-time system of apprenticeship as well as to insure greater opportunities for promotion.

The instruction includes mechanical and architectural drawing, plan reading and estimating of quantities from plans and specification, in addition to the work in the shop. The latter includes bench work and wood turning, cabinet making and mill work, rough framing, interior finish, roof framing and stairbuilding. In the half tone engraving presented upon this page is shown the pupils of the class in stairbuilding at work. The picture also affords an excellent idea of the facilities which are provided.

Periodical visits are made to mills, shops and yards where building materials are stored or being prepared in order to study the arrangement of machinery and methods of handling work, and concrete buildings in course of construction are inspected by the students to learn the method of erection, types of scaffolding and operation of molds and forms. The school provides both day and evening courses. The young men who

unable to work and the company by whom he was engaged paid him for the days of the week during which he actually worked and also sent him one day's pay to complete the week. The plaintiff, however, claimed payment for one full week in accordance with a custom in the building trade. It was true he had taken away his tools on the Saturday that he was taken ill, as he had no wish for any one else to use them as they did on a former occasion when he was ill.

The building manager to the company defending the suit said it was a custom of the building trade not to pay a man for any time he was away, but the judge ruled that the custom had prevailed for centuries to pay a man if he was ill and he decided accordingly.

The board of directors of the Metropolitan Museum of Art has filed plans for a \$500,000 extension of the Museum, the architects being McKim, Mead & White, New York City.

New Publications

Electricity for the Farm and Home—By Frank Koester. Size, $5\frac{1}{4} \times 7\frac{1}{2}$ in.; 280 pages. Numerous illustrations. Bound in board covers. Published by Sturgis & Walton Company. Price, postpaid, \$1.10.

This is a work in which the general reader will be interested, and more particularly the farmer and the villager who is striving to make his life and that of his family broader and brighter. Its chapters deal with the use of electricity on the farm, even to the extent of telling how to plough by the use of this mysterious power. Divers applications of electricity, in addition to the more important uses of it in the principal farm operations, are considered and there is a chapter on electric heating, another on the telephone in rural communities, and still another on the use of electric power in irrigation.

Manual on Building Arbitrations—By G. Alexander Wright; 48 pages. Size 6×9 in. Bound in paper covers. Published by the author. Price \$1.00 postpaid.

This manual is intended especially for the use of architects, contractors, students and construction engineers or others who may be called upon to act as arbitrators or members in the settlement of disputes connected with building or engineering construction operations. It forcefully illustrates the advantages of arbitration over suits at law for the adjustment of building and technical disputes and it also shows in detail the duties of building arbitrators—what to do and what to avoid in conducting technical arbitrations. Not the least interesting feature of the little work is found in the convenient forms or blanks which are bound in at the close of the work.

Summer Camp of Forestry

The College of Forestry at Syracuse lately issued a bulletin describing the summer forest camp held in the Adirondacks during August. It was a camp of instruction along forestry lines and not a summer "Outing," the camp being open to any young man of 16 or over in good physical condition. The camp was in charge of W. A. McDonald, a graduate forester, who has had a number of years' experience in supervising forest camps. The instruction was given largely as field work in elementary forestry and wood craft. There were several instructors constantly in the camp, and practical work in the use of the compass, chain and simpler phases of land surveying were among the matters considered.

This summer camp was unique in that it was the first time that one of the eastern states had attempted to give field instruction in this manner. Those attending the camp lived in 9×9 ft. tents which were provided with folding cots, folding table and lantern.

Another San Francisco House Moving Operation

Supplementing what appeared in our July issue relative to the moving of the Commercial High School building in San Francisco, it may be stated that Nichols & Handley, the same contractors, have taken the contract for moving a four-story reinforced concrete hotel with stores on the ground floor and which covers an area 50×85 ft. The estimated weight of the entire building is 2,500 tons and it is intended to move the three upper floors weighting about 1650 tons. These upper floors will be moved to the adjoining lot while a new foundation is placed. The ground story

will be rebuilt and then the superstructure will be replaced upon it.

The building was erected about two years after the great fire and was considered one of the best concrete structures south of Market Street. The owner, however, employed a contractor who was his own architect and the foundations being laid only a few feet below the street level with light footings, the structure soon began to settle on the west side, the walls finally leaning about 2 ft. out of plumb at the top. Efforts were made to shore up the structure and place piers under it but the piers also settled and it became impossible to rent the stores. Investigation showed that the subsoil under nearly half the building was the bed of an old slough consisting of blue mud and only the excellent quality of the concrete had prevented the building from collapsing. It was decided to give up the ground floor, cutting off the building at the second story. When the upper part was removed 142 piles were driven into the mud. Upon these a solid foundation will be laid and walls erected to the second story, after which the upper part will be set back on its old location.

New York Association of Architects

The New York State Association of American Institute of Architects has just been organized with the following officers: President, Albert Brockway of Syracuse, who is also president of the Central New York Chapter of the American Institute of Architects; vice-president, E. D. Litchfield, of the New York Chapter, and secretary and treasurer, R. D. Collin, of Brooklyn.

The organization we understand will supplement the various chapters of the American Institute of Architects in New York, Brooklyn, Buffalo and Central New York, and will serve as regards matters of interest somewhat as does the national body of the American Institute of Architects to the interests of the architectural profession throughout the country.

New York City's Vocational School for Boys

The graduating exercises of New York City's Vocational School for Boys at 138th street and Fifth avenue, Manhattan, were held on the evening of July 29 when 50 boys received diplomas. The school with the classes at work in the shops was open for inspection until 9 o'clock and the exercises were held in the auditorium. Good practical talks were given by Associate Superintendent Edson and Principal Dr. Charles J. Pickett as well as by some of those giving employment to the graduates. We understand that each graduate has already secured employment. The school was closed during the month of August.

Thomas Graham, one of the veteran builders of New York, recently died at his home in Sherwood Park, Yonkers, at the age of 70 years. He was educated in the public schools, studied architecture and became associated with his father, Charles Graham, under the firm name of Charles Graham & Son. Among some of the well-known buildings in New York City, the firm built the Holland House, the Buckingham Hotel, the Graham House and the homes of several prominent people. He was vice-president of the Real Estate Owners' and Builders' Association, was a Mason, and a member of Sumner Post G. A. R.

It has been decided that Madison Square Garden is to remain the great show place of New York City.

CURRENT NEWS OF THE BUILDERS' EXCHANGES

What Some of the Organizations Are Doing to Promote Greater Interest in Them
and to Augment the Membership

Detroit Builders and Traders Exchange

THE membership of the Builders and Traders Exchange, Detroit, Mich., is assuming such proportions and covers such a wide territory that the Board of Directors recently voted to give Secretary Charles A. Bowen an automobile to use in connection with the work of the Exchange. He accordingly purchased a roadster at once and is now able to call on those members who do not find time to visit the headquarters of the Exchange as much as they would like. Under the new arrangement Secretary Bowen can confer with these members at their places of business and talk over matters in the same way that he would if they were able to attend regularly the daily conferences at headquarters.

The members of the Exchange were recently sent certificates of membership and introduction cards intended as an evidence of connection "with an up-to-date live organization in the front ranks of such organizations throughout the country and one that is well known in other cities and looked up to as progressive." If for any reason the member should sever his connection with the Builders Exchange he would be asked to surrender his certificate.

The bi-monthly magazine issued for the members and in the interests of the Builders and Traders Exchange contains a large amount of unusually interesting matter pertaining to the organization. In the editorial comments it is stated that the general trend of the Exchange continues upward and there is no cessation of activities even if it is warm weather when there is usually a falling off in attendance in the rooms.

Secretary Bowen says that a careful perusal of the contents of the magazine will advise the reader of the work for the 60 days covered by the July issue, and if the members are not already aware of what has been going on the secretary expresses the belief that they will agree that what has been done is to the best interests of all. One of the leading articles concerns the new adjunct to the Exchange, "The Transportation Bureau," for safeguarding the interests of the small as well as the large shippers and receivers of freight. Another article is on the Mechanics Lien Law, and there is reference to the recent outing of the Exchange held at Tashmoo Park, a brief account of which appeared in our August issue.

Outing of New Orleans Exchange

The annual outing of the Contractors and Dealers Exchange of the city of New Orleans, La., occurred on July 24 when about 300 members representing every branch of the contracting and building trades boarded a special train for West End, where they embarked on barges for Pineland Park on the Tchefuncta River. Music for the journey was furnished by Fisher's brass band, and the time between departure and arrival at the destination was largely spent in dancing. Luncheon was served aboard the barges as the Park was not reached until early afternoon. The party then formed in double file and led by the band paraded several times around the place, after which under the direction of Walter F. Jahncke, president of the Exchange and chairman of the "Outing," the members engaged in racing and other athletic contests.

There were fat men's races, lean men's races, a baseball game, and races of classifications sufficiently varied to make every one eligible to participate.

At four o'clock the excursionists sat down to a dinner spread upon several long tables placed under the big oaks of Pineland Park. After dinner the excursionists started on the trip across the lake and finally reached the city about 10 o'clock in the evening, feeling that the affair had been a success in every particular.

Baltimore Exchange Issues Monthly Report

At a recent meeting of the Board of Directors of the Builders Exchange of Baltimore, Md., the secretary was instructed to prepare each month a letter dealing with the activities of the organization. These letters will have for their purpose the development of greater interest among the members, and Secretary I. H. Scates will be glad at all times to receive suggestions or criticisms that will aid

him materially in his efforts to keep the members in touch with just what is being done.

The first monthly letter was published on the second of August, and others will follow at regular intervals.

The Master Builders Association of Pueblo, Colo.

As a result of a meeting of some 20 or more of the leading men of Pueblo, Colo., engaged in the building and allied industries, held the latter part of July in the city named, a Master Builders' Association was formed, with Monroe Marble as president. He has appointed committees on Constitution and by-laws, Membership and Rooms, all of which will report later.

All general and sub-contractors in the building business in the city are eligible to membership.

A Builders Exchange at Brandon, Manitoba

A Builders Exchange has recently been formed at Brandon, Manitoba, with 30 charter members and the number is rapidly growing. The following officers have been chosen:

President.....T. M. Harrington
Vice-President.....J. D. Kennedy
Treasurer.....A. R. McDiarmid
Secretary.....E. P. Fallor

The outlook is regarded as very promising and the members are correspondingly enthusiastic.

Oakland Material Men Dine

On the evening of July 25 the Material Dealers' Association of Alameda county, Cal., held a reunion dinner at a downtown restaurant in Oakland, J. C. Downey, who was active in organizing the association, presiding. About sixty men were present, representing all classes of building material. Informal speeches were made, and a musical program furnished under the direction of Harry G. Williams, the program being further embellished by turns from several vaudeville houses.

In order that the new Oakland city hall may not be overshadowed, Palmer, Hornbostel and Jones, of New York, who designed the building, have recommended that the height of future buildings in that city be limited to 15 stories, and the idea appears to meet with some favor from the city council.

A Master Builder's Course of Instruction

What is said to be the first course of its kind ever offered by an English university for students who are working with the object of becoming master builders or of occupying other important positions in the building industry is a Works Pupils' Certificate course which has just been arranged by the University of Sheffield, England.

The course, which will be started at the next session in October, has been based on the lines of the Works Pupils' Certificate Course in Engineering, the students attending day courses of study at the university during the winter from October to March and at the works during the summer from April to September. According to present arrangements, a certificate will be awarded to those who complete the three years' course and pass the prescribed examinations. It is felt that as the art of building is becoming more and more scientific in its tendencies there should be facilities for higher instruction such as the course indicated is expected to afford.

It is felt that students taking the course will acquire a theoretical knowledge which will enable them to benefit more fully from their practical work during apprenticeship and be of even greater value subsequently.

A BRIEF REVIEW OF THE BUILDING SITUATION

Figures Showing Building Activities in Leading Centers Based on the Value of Permits Issued During July, 1912, and July, 1913



TRADE was dull in most lines during the month of July, and this was reflected in the volume of building operations for that month. Some sections showed up, however, much better than others, but in the northeastern section of the country many of the cities show a decided decline. New York City shows a decline of 9 per cent. over the figures of July, 1912; Pittsburgh loses 34, Baltimore 40, and Washington 28 per cent., while Philadelphia shows a gain of 1 per cent. Of the smaller cities Harrisburg shows an increase of 153 per cent.; Hartford 58; Troy 199; Wilkes-Barre 198, and Paterson 19. Albany loses 25 per cent., and Worcester 41 per cent. as compared with the same month last year.

In spite of the poor showing made by Pittsburgh, several large deals were inaugurated there in July which show confidence in the future financial situation. The fact that New York makes the best statement in several months shows that confidence is returning in that quarter. Although Philadelphia shows a very slight increase over last year, there is a decline over the figures of the preceding month.

Comparative figures are given below for many of the cities of the northeastern section of the country:

NORTHEASTERN CITIES

City	July, 1913	July, 1912
Albany	315,770	419,241
Baltimore	394,089	781,909
Bridgeport	193,027	.....
Harrisburg	409,055	161,625
Hartford	970,055	675,550
Manchester	162,035	194,248
New Haven	364,486	334,305
Newark	1,307,089	1,994,236
New York	13,351,816	14,703,368
Paterson	253,590	212,610
Philadelphia	3,480,700	3,456,800
Pittsburgh	777,128	1,186,745
Rochester	511,733	931,166
Scranton	133,510	124,627
Syracuse	341,275	349,775
Troy	167,840	56,215
Washington	633,725	879,941
Wilkes-Barre	633,449	212,603
Worcester	385,999	652,192

The cities of the southeastern section show noticeable declines as in the case of Richmond, with a loss of 89, and Atlanta with a loss of 58 per cent over the figures of the corresponding month of last year. Tampa, Fla., makes a very favorable showing, with an increase of 48 per cent, while Roanoke, Va., steps into the limelight with an increase of 206 per cent. In the latter case, however, the cause is found in the issuance of permits for several large buildings to be constructed by the Norfolk & Western Railway at that point.

Labor troubles cast a shadow over the building situation in the cities of the north central portion of the country, which is evidenced in the case of Chicago, with a loss of 41 per cent, and in Cincinnati with a loss of 40 per cent, while Milwaukee also shows a loss of 40 per cent over the figures of July, 1912. In the case of Chicago, however, the marked decrease in the volume of building operations seems to have had its effect in producing peaceable solutions of many of the labor difficulties in that city. In Cincinnati it is stated that 75 per cent of the construction work in that city was tied up during the month of July as a result of the teamsters' strike, which is said to have been especially aggravated in the case of residential work, where union carpenters and plasterers refused to handle material hauled by non-union men. Duluth and Omaha show losses of 51 and 31 per cent, respectively. Des Moines, Iowa, loses 71 per cent, and Indianapolis, Ind., 12.

On the other side of the ledger, however, are notable gains. Cleveland leads the line with a gain of 40 per cent over figures of July, 1912. Detroit makes a good showing with an increase of 30 per cent, and Minneapolis 20; while, of the smaller cities, Topeka, Kan., reports the substantial gain of 46 per cent; Grand Rapids, Mich., 18, and Evansville, Ind., 44 per cent.

NORTH CENTRAL CITIES

City	July, 1913	July, 1912
Akron	707,265	664,130
Cedar Rapids	319,000	315,450
Chicago	6,035,000	10,265,800
Cincinnati	582,430	971,214
Cleveland	2,746,310	1,828,201
Columbus	421,945	423,883
Des Moines	731,164	458,650
Detroit	2,646,455	2,038,255
Duluth	236,413	481,015
Evansville	122,990	85,312
Grand Rapids	242,782	204,998
Indianapolis	1,120,566	1,280,512
Kansas City	857,475	884,396
Milwaukee	7,817,077	3,021,476
Minneapolis	1,054,970	879,965
Omaha	392,525	569,329
Peoria	199,375	244,690
Sioux City	175,000	204,490
South Bend	57,820	213,798
Toledo	671,605	637,980
Topeka	115,177	78,882

Losses and gains are about equally divided for the cities of the south central portion of the country. Citizens of Dallas, Texas, rejoice in the continued prosperity of that city, as shown by improvements aggregating \$806,250 for the month, an increase of 132 per cent over the building figures of the corresponding month of last year. New Orleans shows a gain of 46 per cent over the figures of July, 1912. San Antonio gains 14, and Shreveport, La., 32 per cent. St. Louis just exceeds the million-dollar mark, but records a loss of 39, while Nashville and Memphis record losses of 59 and 55 per cent, respectively. St. Joseph, Mo., loses 38 per cent.

SOUTH CENTRAL CITIES

City	July, 1913	July, 1912
Dallas	806,250	347,700
Memphis	304,266	680,629
Nashville	56,055	138,707
New Orleans	563,500	379,296
St. Joseph	57,409	92,373
St. Louis	1,045,730	1,724,655
San Antonio	244,965	215,695
Shreveport	158,361	119,569

Notable gains are made by some of the cities of the northwest, while those of the southwest show serious declines. Seattle shows a gain of 119 per cent and Tacoma 267 per cent. In the case of Seattle the gain is largely to the credit of the warehouse and factory building column, with churches and municipal buildings next, while a gain of only about \$30,000 is made in the case of detached residences. San Francisco records a loss of 42 per cent and Los Angeles of 7. Oakland loses 35 per cent and Salt Lake City makes a slump of 64 per cent over the figures of July, 1912. Of the smaller cities Phoenix, Ariz., climbs into notice with a total value of building permits of \$216,439, which is well distributed between residences, stores and warehouses.

EXTREME WESTERN CITIES

City	July, 1913	July, 1912
Denver	454,020	.....
Los Angeles	3,324,214	3,585,014
Oakland	660,588	1,010,444
Phoenix, Ariz.	216,439	.....
Sacramento	251,012	.....
Salt Lake City	149,740	420,185
San Francisco	1,415,819	2,452,725
Seattle	1,414,620	645,325
Tacoma	529,599	144,194

For the seven months ending July 31 the building permits issued in 57 cities reached a total value of \$385,204,400, compared with \$357,575,331 for the corresponding seven months of last year, an increase of 8 per cent.

In the settlement of the carpenters strike at Portsmouth, N. H., it was agreed that eight hours shall constitute a day's work and that all over eight hours shall be paid for at time and a half with double time for Sundays and holidays. The wages are 40 cents per hour.

The cooling of buildings in summer is an economic as well as a sanitary proceeding.

BUILDERS' APPLIANCES AND EQUIPMENT

Some Things of Seasonable Interest to Those Having
to Do with the Building Business

Giblin Standard School Room Heater

The time is rapidly approaching when attention must be given to the comfort of pupils in the classroom of the district schoolhouse during the winter months, and this is usually accomplished by placing a heater of adequate capacity in the room. In this connection the subject is given added interest by the literature which has been issued by manufacturers of heaters designed especially for the purpose indicated. Occupying a prominent place among the latter is the Giblin Standard School Room Heater, a view of which with the casing partially broken away is presented in Fig. 1 of the engravings, and which is manufactured by Giblin & Co., 99 Broad Street, Utica, N. Y. This construction is designed not only to heat the room in which it is placed but also to thoroughly ventilate it. Provision is made for heating the air in the room and also fresh air taken from outside. It will be seen from an inspection

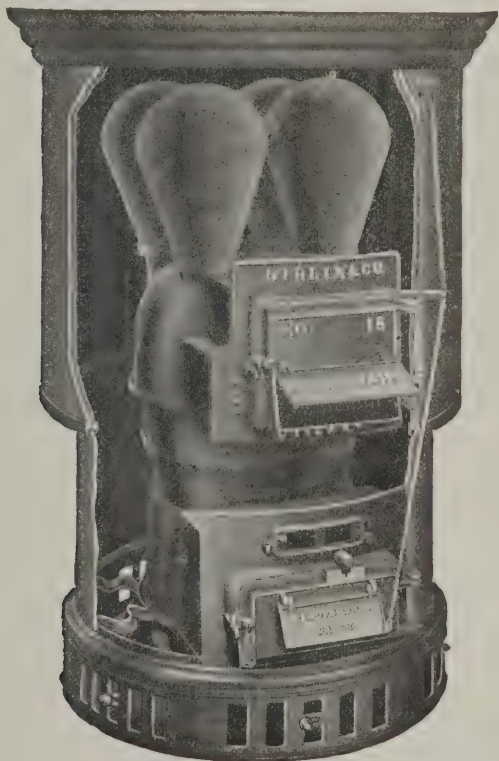


Fig 1—Giblin Standard School House Heater With Portion of Casing Broken Away Showing Radiator Arrangement.

of the picture that in the panels in the base of the heater are openings fitted with slides so that one or all of the openings may be used according to requirements. When the slides are open the air is admitted from the room to the heater chamber through which it passes, rising upward in the room and as it cools descends to the floor. In this way the circulation of the air is continuous. After the air in the room has been warmed to an agreeable temperature the slide may be opened admitting air from the outside and thereafter both the outside air and the air in the room is circulated in a way to insure thorough warming of the fresh air to a uniform degree and distributing it thoroughly to every part of the room. The foul air is removed by means of a vent on the under side of the smoke stack and provides for the positive removal of all the air from the room four times an hour.

The heater is of all cast-iron construction, the bottom being made in one strong casting having an ornamental skirt at the side. The ash pit is deep and wide with an unusually large space for holding ashes. It has a mica

door for access to the fire over the grates to dislodge clinkers or other foreign substances. The shaker bar extends through the ash door frame, thus permitting the grates to be shaken when they are closed tight and preventing the escape of dust from the ash pit. The fire pot is made in two nearly equal parts provided with deep cup joints. The feed section is strong and heavy, oval in form and so constructed that the heat on the inside is directed strongly against that part of the casting where the cold air comes in contact on the outside. The grates are of the triangular bar type and can be furnished in two styles. The heater is intended to burn hard or soft coal or natural gas. These heaters are sold direct to school boards, contractors, builders and owners, as well as through architects specifying them in their schoolhouse work. An attractive pamphlet which the manufacturers have issued illustrates and describes this heater in detail and also shows by means of skeleton outline cuts the system of air circulation.

The Plastergon Wall Board

Wall board is of special interest to the builder and the carpenter-contractor by reason of the fact that it not only opens up to them a new source of profit but at the same time enables them to produce a more satisfactory job for their customers, thereby meriting that best of all advertising—the reputation of turning out better work than a competitor. An interesting feature in connection with wall board is that it is sanitary, can be removed and replaced without injury for the insulation of pipes or wiring or for the repairing of plumbing or electric fixtures. It does not crack, disintegrate or crumble and can be used in any place where lath and plaster may be utilized with results which cannot be obtained with the latter materials. The merits claimed for the wall board placed on the market under the name of "Plastergon" by the Plastergon Wall Board Company, Dept. A, North Tonawanda, N. Y. are worthy of more than passing notice. The material is made by a special process by which the fiber from which the board is produced is treated chemically in such a way as to render it moisture-proof and thereby enable the company to guarantee every panel.

The Plastergon people have also inaugurated the policy of giving exclusive representation in any territory to the dealer or builder who will push the sale of the product, thereby protecting the representative against the danger of having the results of his energetic work in behalf of "Plastergon" shared by a competitor after he has built up a profitable business. The company also co-operates with the builder who represents it by an energetic campaign of advertising over the representative's name, thereby enabling him to become really a distributor, bringing the orders to his door to be filled. As a result of this policy the company has secured the co-operation of a vast number of builders and dealers in all parts of the country, but there is still much territory open for energetic and up-to-date builders and dealers. Any carpenter or builder who is interested in adding to his business a line which is likely to result in his securing profitable jobs in his neighborhood can secure samples and prices of "Plastergon," together with the exclusive agency proposition, by writing to the company at the address given above. Through this proposition he may not only place himself on an equal footing with his competitor in introducing to his customer one of the latest products for interior construction and decoration, but he may control for himself the entire business in his territory for a very profitable line of goods.

The Hollow Wall and How to Build It

The temperature-insulating properties of air are well known. If, therefore, an air space is left between the exterior and the interior surfaces of the walls of a residence or other structure, the building will be warmer in

winter and cooler in summer than would otherwise be the case. The principal objection to the presence of this air space is that, if the walls are constructed of inflammable material, the air space makes an ideal flue through which the flames may pass to other portions of the structure. If, however, the walls are fireproof, this objection is removed. A booklet has just been issued by the Van Guilder Hollow Wall Co., 712 Chamber of Commerce Building, Rochester, N. Y., which contains a thorough exposition of the methods of constructing hollow walls of concrete by means of the Van Guilder Hollow Wall Machine. The book is copyrighted and contains 54 pages, with many diagrams and half tone illustrations.

The Van Guilder machines build the walls in $9\frac{1}{2}$ -in. courses around the building, one course above the other, all knitted together and bonded into a double monolithic wall. It is stated that 1 cu. yd. of bank sand and gravel, and 1 barrel of Portland cement will make 43 lin. or running feet of double wall $9\frac{1}{2}$ in. in height, each wall 4 in. thick, which is equal to 32 sq. or surface feet; and that one operator on a machine and three or four helpers (the number depending upon conditions) will build that amount of wall in one hour.

Stucco is now employed very extensively in the construction of residences and other buildings, and a considerable portion of this book is devoted to a discussion of covering exterior walls with stucco, having particular reference to its application to concrete surfaces. The booklet will be sent to any one who mentions *The Building Age* in his letter of application.

New Styles of Petz Store Front Bars

Within the past few weeks there have been completed and are now being brought to the attention of architects and builders four new styles of Petz store front bars which are referred to as being more compact than any that are now manufactured by the Detroit Show Case Company, 483 West Fort street, Detroit, Mich. The new styles referred to consist of a series of a sash, two corner posts and a division bar. In Fig. 2 of the engravings we show a section of one of the bars full size. Although small and neat the bars follow the safe Petz principle of holding the glass in a cushion of wood. The statement is made that the metal does not touch the glass at all, thus avoiding the danger of breakage from the meeting of the two hard substances—metal and glass. The bars may also be reinforced with a steel backbone if so desired. The

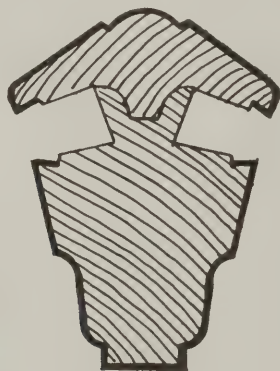


Fig. 2—New Styles of Petz Store Front Bars.—Vertical Cross Section of bar full size

same simple method of installation is used, the inner core being first put in position, after which the glass is laid in the rabbets and the outer core screwed in place.

"Red Devil" Seavey Patent Miter Box

The miter box which is being manufactured by the Smith & Hemenway Company, 150 Chambers Street, New York City, is meeting with a very gratifying reception at the hands of the trade and the statement is made that since it was first placed upon the market over 130,000 have been sold. The light weight of the miter box is referred to as a very convenient feature enabling the mechanic to use it either on the bench, out on a job or he can readily carry it up on a ladder. No special pins, guides or gauges are required and any saw may be used with the miter box. It is of metal, has a nickel plated gauge and a range of 180 degrees, so the mechanic can cut any angle or miter with a range of 90 degrees right hand and 90 degrees left hand. It is constructed on the jack-knife principle and can be folded up and placed in a very small tool kit, taking up a space approximately $2\frac{1}{2}$ in. high and 8 in. wide. Any reader of *The Building Age* who is interested in this miter box can secure detailed information regarding it by ad-

ressing the company as above. It is, however, on sale by leading hardware dealers throughout the country.

The Tannewitz Type "C" Woodworker

A number of interesting improvements are embodied in Type "C" of the Tannewitz woodworker illustrated in Fig. 3 of the engravings made by the Tannewitz Works, Grand Rapids, Mich. The machine has a hollow chisel mortiser attachment in place of the boring attachment which will be found very valuable to the carpenter-contractors operating small woodworking shops, for the mor-

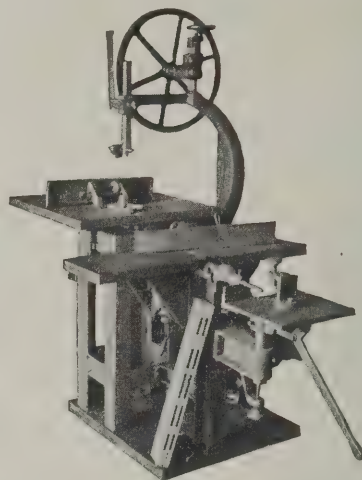


Fig. 3—General View of the Tannewitz Type "C" Woodworker

tises as well as the tenons of screen and other doors can now be readily turned out by means of it. A dado head mounted on the saw arbor and set to project through the table the desired height is referred to as just the thing for quickly cutting tenons. Additional devices furnished are the band saw and the hand planer. The band saw is a regular 20-in. size and will take 11 in. under the guide. The table will permit of tilting for bevel band sawing. The band saw arm will swing to one side at the convenience of the operator to permit wide ripping on the saw bench. The planer is an 8-in. machine with the tables so constructed that grooving and molding can easily be done. The molding knives bolt on the cylinder and pressure springs are used to hold the stock down while passing over the knives. Attention is called to the fact that the makers allow a 30-day trial privilege to prove the great value of the machine. A four-page folder which the company has issued gives brief specifications of the machine and shows its appearance ready for operation.

The Book of 100 Houses

We have just received from Samuel Cabot, Boston, Mass., a copy of the last edition of that very attractive publication known as "The Book of 100 Houses." It derives its title from the fact that it contains more than 100 photographic views of beautiful country houses designed by leading architects all over the country and all stained with Cabot's Creosote Shingle Stains. Accompanying the pictures is brief descriptive letter press with which is interpolated many testimonial letters from those who have practically demonstrated the merits of the stains in question. Reference is also made to Cabot's sheathing "Quilt," the material of which it is prepared and the purposes for which it is used. The matter is arranged with a due regard to typographical effects, and the little work cannot fail to prove interesting to a large class of our readers, any one of whom may secure a free copy of the book by sending to the address given.

New Building for F. E. Meyers & Bro.

The contract for an office building, which when completed will be one of the largest erected in recent years in that city, has just been awarded by F. E. Meyers & Bro., Ashland, Ohio. The new structure is to be an extension of the present office on Orange Street; will be four stories and basement in height, and will cover an area 106 x 60 ft. The main floor will be devoted to the offices of the company; the second floor will be used for overflow files, printed matter, storage, etc.; the third floor to storage purposes, and the fourth floor to a large assembly and display room for traveling men's conventions, meetings of employees, etc. The architect, Vernon Redding, 301 Bird Building, Mansfield, Ohio, states that the building will be modern in design and equipment and is estimated

Give Us a Crack At That Next Job!

**Send Your Material List at Once
for Free Estimate—Then Decide!**

All the Gordon-Van Tine Company asks of any Contractor and Builder is a chance to *figure on one job* and then if our estimate entitles us to the business, a chance to prove up on the *quality* proposition.

Many hundreds of Contractors who now buy *all* their material from us began in just that way.

They got us to put in an estimate, side by side with their local concerns.

We won out *on paper*.

Then, in fairness to us, they gave us the *order, and we promptly delivered the material, right up to specifications*.

The way we *hold* their business is by making good *all the time*—

Let's Get Acquainted

We want to do business with you. The inducements we offer are so great that in justice to yourself you cannot afford to overlook them. The *price inducement* means an average saving of 25 to 50 per cent.

The *quality inducement* means bright, new, well-manufactured material, guaranteed up to the standard adopted by the Sash and Door Associations.

The *Service Inducement* is of the utmost importance and value to Contractors. It means that you have at command a big organization of building material experts, trained to a high point of efficiency. These men handle every detail of your order *intelligently, promptly and carefully*.

Our Architectural Department is another valuable factor in Gordon-Van Tine Service.

We save Contractors many thousands of dollars per year in architects' fees, on top of the saving on *materials*.

We will be glad to send you our latest Building Material Catalog, also our famous Book of Plans.

In writing for Plan Book, enclose 10c for postage and mailing.

And be sure to give us a crack at that next job.

Gordon-Van Tine Company

662 Federal Street, Davenport, Iowa

We Want Every Carpenter and Builder to Have Samples of PLASTERGON

The public loves "things that are different," and the builder who can suggest something different—especially when it's better and less expensive—gets the contract.



Plastergon can be used wherever lath and plaster could be used; either for new work or remodelling. It costs less; lasts longer; and is more ornamental. It gives the builder a profit he never had before, besides putting the whole job into one contract.

Plastergon is moisture proof.
Plastergon is fire and sound retarding.
EVERY PANEL IS GUARANTEED.

REMEMBER
THE
NAME

PLASTERGON
TREATED
WOOD FIBRE
WALL-BOARD

You need samples and prices on hand to show prospective customers.

Write for them—they're free.

Plastergon Wall Board Co.
Dept. B, Tonawanda, N. Y.

to cost in the neighborhood of \$50,000, exclusive of heating and plumbing. The contract was awarded to Schell & Baker, Mansfield, Ohio, in competition with a number of construction companies in different parts of the state.

Something About Asbestos "Century" Shingles

The introduction and gradually increasing use of the Asbestos "Century" Shingle in building construction has given rise to much comment and controversy over the various merits of this type of roofing. It is generally conceded by architects and building experts to be an estimable product from an economic and fireproofing standpoint, but there has been some adverse criticism by the architects of more pronounced esthetic ideas, based on the alleged flat and characterless appearance of these shingles when applied on a roof in accordance with the French or Diagonal Method. In searching about for a means of gratifying this demand for heavier roofing effect, the manufacturers of this product have devised a scheme of application known as the "Honeycomb Method." Essentially, the detail of application is precisely the same as the ordinary French or Diagonal Method; no more material is required to cover a given roof area than is required when laying the shingles according to the regular diagonal scheme, so that the economy of this method of application is preserved. Each shingle is irregularly hexagonal in shape, a deep shadow resulting from the lower horizontal edge of an upper course overlapping the converging diagonal lines of the course below. Professional comment has been almost uniformly favorable to this method. The manufacturer, Keasbey & Mattison Company, Ambler, Pa., upon request supply blue prints and full information needful for the specification and application of this really artistic shingle roof.

Accuracy in Building Construction

It will be conceded without argument that one of the most important things in connection with the construction of a building is in getting it started right. Where there are a number of footings to be put in and where there is any structural iron work or stone setting it is important that the preliminary work be laid out with the greatest accuracy. The Improved Level which has recently been placed on the market by the David White Company, 419 East Water Street, Milwaukee, Wis., is designed especially for the use of the contractor and the builder in connection with work of the character indicated. The telescope on this level is said to be sufficiently powerful to detect an error of 1/16 of an inch in a distance of 300 ft. While this may seem a case of extreme accuracy, yet it is just as well that the contractor be prepared to show the architect as well as his client that he is putting up the building exactly as it should be. The average owner cannot fail to be favorably impressed when he sees the contractor laying out his work, checking up his levels, etc., with an instrument that is designed especially for the purpose. It shows the contractor to be anxious to have his work right and to be able to use instruments which will give accurate results. While care is necessary in the use of an instrument of the character indicated there is nothing about the level which will prevent the ordinary carpenter or contractor from using it correctly—in fact with little more skill than is required to use the ordinary old-fashioned carpenter's spirit level, while the results are far more accurate. The company has issued what is known as "Circular X," which describes this level in detail as well as the variety of work for which it is adapted. Full instructions for use are also given, together with prices, terms, etc.

Catalogue of Starrett Tools

We have received from the L. S. Starrett Company, Athol, Mass., a copy of its new 320 page catalogue of fine mechanical tools which are manufactured in great profusion. The work is known as Catalogue No. 20 and is one of the most complete of its kind which the company has ever sent out. In fact it contains 46 more pages than were found in Catalogue No. 19, and in connection with the multitude of illustrations are prices, numbers, sizes and brief descriptive letter press. The list of tools covers a very wide range and includes practically everything the mechanic is likely to require in the way of fine tools. Of special interest to carpenters and builders are calipers and dividers, gauges, levels, nail sets, vises, plumb bobs, protractors, saws, scrapers, screw drivers, squares of all sorts, straight edges, trammels, bevels of various kinds, combination sets, transits, levels, etc., etc. In addition there are many pages of data and tables such as metric conversion tables, decimal equivalents, weight computing tables, etc. There have been several additions in the way of tools to the Starrett line since the last edition of the

(Continued on page 46)

MITRE BOXES MACHINES TRIMMERS ETC.



We have 16 styles and many sizes; from the ordinary old-fashioned wooden mitre box up to the Marsh-Langdon all-metal machine to cut any angle; including Hand and Foot Mitres, Trimmers, etc.

We have a 16-page catalog showing them all which we will send to those who specify Catalog No. 3141.

WORK BENCHES: We have a new catalog No. 3142, showing 23 distinct styles. Will send copy upon receipt of request.

HAMMACHER, SCHLEMMER & CO.

HARDWARE, TOOLS AND SUPPLIES

NEW YORK, Since 1848

4th Ave. & 13th Street

A Mould for Plaster Cornice of Rooms



WILL you examine this new device—"The Monarch Patent Cornice Mould," if we send it FREE—even the transportation charges fully prepaid?

I know what it is to fuss around after you get to the corners of the room, to make the cornices, etc. I was up against that for years on every job. At last I put my thinking cap on. Took me a year or more to get the right idea, and another year to try the device out thoroughly to see that it worked and worked right.

I know now that my mould will make straight cornices and perfect corners every time without your using any other tools, and I know what I'm talking about when I say that my mould will save its cost on every job. THE MOULD WILL MAKE IT EASY FOR YOU TO UNDERBID THE OTHER FELLOW AND YET LEAVE YOU AS GOOD A PROFIT AS HE HAD FIGURED ON MAKING WITHOUT THE MOULD.

I don't care if you're "from Missouri!" or elsewhere. I can show you—and I'm willing to show you **without it costing you a cent.** Just fill in the coupon, mail it, and the trick's done. You'll get a mould promptly for **five days' free trial.** Convince yourself thoroughly before you spend a penny.

And here's an added special. To get the mould around the country quickly. I am going to make a **special 40% discount on the first 500 sets.** Regular price is \$50. Forty per cent. off makes the cost price \$30, or \$33 if in installments of \$3 a month for 11 months. Either way suits me—I'm willing to trust my brother carpenters, builders and contractors.

YOU need this mould in your business—it will save its cost on nearly every job—and you can pay for it piecemeal out of the saving.

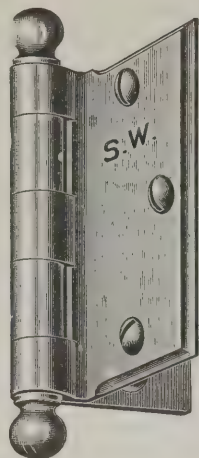
TIMOTHY F. HORAN

10 MAPLE STREET

COOPERSTOWN, N. Y.

Send no money—merely mail the coupon—today.

.....1913
Timothy F. Horan,
10 Maple St., Cooperstown, N. Y.
Dear Sir:—Please send me the Monarch Patent Cornice Mould free for 5 days' trial. At the end of that time I will either return the Mould or else remit \$30 (cash price of \$50, less 40% special discount) or remit \$3 and then \$3 every month thereafter for 10 months (making \$33 special installment offer).
I understand the Mould will make straight cornices and perfect corners; will make any style and size of cornice with complete corners, as well as straight work.
Signed
Address



Time and Labor Saved and
the Owner Satisfied

STANLEY'S
No. 165

Ornamental Surface Butt

BEVELED EDGE
UNEQUALED IN QUALITY

With these Butts it is not necessary to mortise the door, as the ornamental leaf screws on the surface.

The Butts can be changed to either right or left hand by simply unscrewing the slotted tip and reversing the pin. Sizes $1\frac{1}{2}$ to $4\frac{1}{2}$ inches.

The Guaranty



of Quality

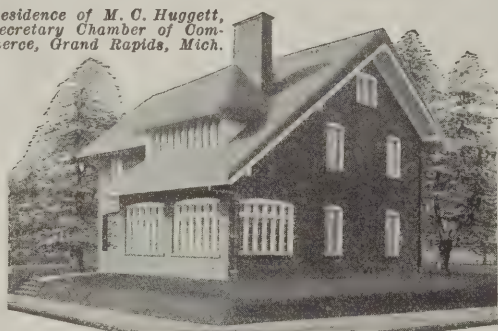
Write us for a Handsome Booklet of
Wrought Steel Hardware

Department E.

THE STANLEY WORKS

NEW YORK NEW BRITAIN, CONN. CHICAGO

Residence of M. O. Huggett,
Secretary Chamber of Com-
merce, Grand Rapids, Mich.



Unusual, Beautiful Architectural Effects

WITH usual roofing materials it is impossible to produce such a unique, attractive roof as that illustrated above. But with Reynolds Flexible Asphalt Shingles roll edges, thatch effects and rounded corners are easily made. Such a roof adds real distinction to a well-designed, well-built home, whether modest or most pretensions.

Reynolds Asphalt Shingles are not flimsy or soon destroyed. On the contrary, they last longer than wood shingles. They cannot warp, split, crack, curl, drop or blow off. Sun, snow, rain or hail fail to impair their usefulness or beauty.

Reynolds Asphalt Shingles are a real protection against fire. Flying sparks cannot set them ablaze. They save part of your insurance cost.

Reynolds Asphalt Shingles

Guaranteed for 10 years—will last many years longer—

are made of crushed slate or granite securely imbedded in pure asphalt. Natural colors of garnet, red or gray-green which never fade and never need painting. We are the original makers of flexible asphalt slate shingles and tested them for ten years before putting them on the market. They are uniform in size—8 inches by $12\frac{1}{2}$ inches—and are laid 4 inches to the weather.

Let us send you a booklet showing photographs of modern houses

roofed with Reynolds Asphalt Shingles—signed opinions of the owners are included. Also opinions of leading architects and builders. Write for a copy TO-DAY.

H. M. REYNOLDS ASPHALT SHINGLE CO.
159 Grant St., West, Grand Rapids, Mich.

Established 1868

Member of National Builders Supply Association

company's catalogue was brought out, these including protected steel tapes for architects and contractors, long steel rules, combination square with shrunk graduations and surveyors' chain tapes. The catalogue is arranged with a great deal of care, is of convenient size to handle, measuring as it does $5\frac{1}{4} \times 7\frac{1}{2}$ in., and has a comprehensive index alphabetically arranged which tends to greatly facilitate reference.

Changes in Auld & Conger Co.

Announcement was recently made of the retirement of J. W. and F. H. Conger from the Auld & Conger Co., Cleveland, Ohio, manufacturer of roofing slate, the interests of the Congers having been purchased by D. Auld, Jr., and C. A. Lowry. Mr. Auld, who has been president of the company since its organization, will continue to manage the quarries and manufacturing departments. C. A. Lowry is vice-president and C. A. Beard, secretary. W. D. Jones will continue to represent the company as salesman.

A New Gage Block Plane

The Gage Tool Company, Vineland, N. J., has just added to its line of specialties a new block plane of iron which is said to be the lowest angle of any block plane with which the company is familiar. The plane is also self-setting, and when the iron is taken out of the plane and replaced the position it occupies when returned is practically the same as before removal, the variation being less than $1/1000$ of an inch in the thickness of two shavings taken at different settings. The company points out that the new plane is as accurate as its self-setting bench planes, which have been advertised in *The Building Age* for something over 25 years.

New Form of Expanded Metal Lath

A new form of expanded metal lath for concrete reinforcing and miscellaneous fireproofing which bears the name of "Self-Sentering" and which is shown in Fig. 4 has been placed on the market by the General Fireproofing Company, Youngstown, Ohio. It is a combined reinforcing and centering, a one-piece steel lath and stud, or

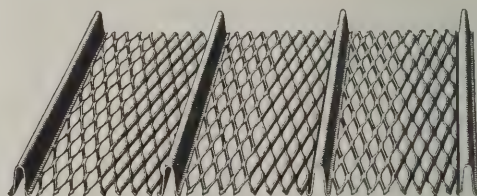
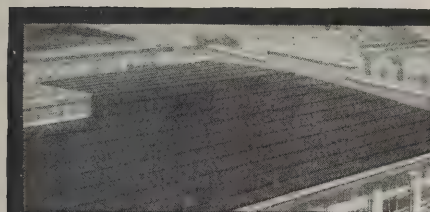


Fig. 4—New Form of Expanded Metal Lath

furring. It is made of a series of heavy cold-drawn ribs $13/16$ in. high, spaced $3\frac{1}{2}$ in. between centers, connected by expanded metal, all cut and drawn from one sheet of steel. It is claimed that the tensile strength of the ribs is increased from 20 to 40 per cent. and their elastic limit from 60 to 100 per cent. because of their being cold drawn instead of stamped. The ribs are made with sides parallel to give them maximum rigidity and with a beaded edge at the joining of the expanded metal fabric to stiffen them still further. The connecting fabric is so designed that the diamond shaped meshes diffuse strain from concentrated loads, afford an effective continuity of the reinforcement and tend to transfer tensile stresses in steel to compression in the concrete, and insure that every ounce of metal is in tension. There are no breaks at right angle to the line of stress and no metal is wasted to act as mere connecting members. The mesh, it is claimed, affords a perfect mechanical bond for concrete. It is stated that "Self-Sentering" offers a bonding surface eleven times as great as the same sectional area in reinforcing bars. The same mesh also affords an unbreakable key for plaster or mortar. Sheets of self-centering are 28 in. wide and are furnished in lengths up to 14 ft. These reduce the cost of placing the metal as compared with similar products narrower in width. A 14-ft. sheet covers nearly 33 sq. ft. of surface. The number of laps is accordingly decreased with a saving of labor. "Self-Sentering" is made from a special grade of sheet steel for this purpose. While absolutely rigid the long way of the ribs it is pliable the other way of the sheet. It is stated that it can be bent and twisted or folded again and again without showing sign of fracture and returned to its original form as good as new. This feature makes it useful for curved surface work, where it is necessary for ribs to run at right angles to the line of the curve without danger from breaking. It can be used for all classes of buildings, for concrete

(Continued on page 48)

Carpenters, Builders—there is a simple method of applying Certain-teed Roofing on any kind of a building



Certain-teed Specification Roofing
for Sky Scrapers and Factories



Certain-teed Shingles for
Bungalows and Residences



Certain-teed Roofing in Rolls
for Farm Homes and Buildings

Certain-teed Roofing

(Quality *Cert*-ified

Durability *Guaran-teed*)

Guaranteed 15 years—wears longer

Rolls and Shingles

The roofing that has “made good” on the roof

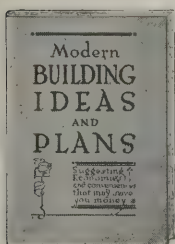
When ready roofing was first put on the market, many architects, builders and carpenters preferred to wait and see it tested on the roof.

The ready roofing that won out had to do so on merit. Certain-teed Roofing settled all arguments by giving absolute satisfaction in all climates and under severe conditions. Its use on all kinds of buildings has grown by leaps and bounds.

The durability of this modern, easy-to-lay Certain-teed Roll and Shingle Roofing is remarkable—it is guaranteed for fifteen years and will last much longer.



Look for the
Certain-teed
Quality label on
each Roll and
Crate of Shingles



Free to builders and carpenters

Apply to the dealer from whom you buy your building materials for our new book, “Modern Building Ideas and Plans.” It will help you in your business. It contains valuable ideas and building aids.

Certain-teed Roofing is used anywhere—sold everywhere—
for sale by all dealers and applied by all leading roofers

General Roofing Manufacturing Company

E. St. Louis, Ill.

York, Pa.

Marseilles, Ill.

Minneapolis, Minn.

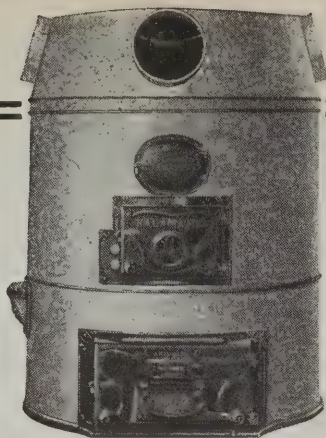
San Francisco, Cal.

Winnipeg, Man.

London, England

Hamburg, Germany

Easy
to
Install



Sure
to
Please

Good Profit For You

The furnace is not one of the first things you handle in building a house, but it is one of the *first in importance*.

Many builders who have done the best kind of carpenter's work, masonry, plumbing, etc., and who were entitled to the owner's gratitude so far as the structure itself was concerned, have had grief in the end because the heating plant was not right.

You never have trouble of this kind when you put a Kalamazoo in any job you have. We want you to get acquainted with Kalamazoo *quality, service and profit*.

This is the furnace easiest to install—its results are guaranteed—and the saving of jobber's and retailer's profits, expenses, etc., enable us to put better quality into a job and deal with you on liberal terms. We are able to *prove* the supremacy of the

Kalamazoo Furnace

Simplicity of installation is one big point. From a sketch of the house, showing location of rooms, size, prevailing winds, direction the building faces, etc., our expert engineers work out blue prints that are sent you free. These show *everything*—make it all simple. It is the most complete installation service ever devised.

An absolute guarantee of quality and satisfactory use *backs up every Kalamazoo heating system*. The owner *must* be pleased—and that responsibility is ours. Perfect insulation—greater heating surface—fuel economy—complete air circulation; these and other points of Kalamazoo supremacy are *proved*.

There are no unpleasant "come-backs" when you install a Kalamazoo. We are behind the owner—behind *you*—with that strong guarantee and with a system that holds our last degree of confidence because of its known goodness.

Write for Free Book No. 948

telling all about Kalamazoo service—its superior construction. We'll make you liberal terms—show you how the building season of 1913 can be a *better* season for you from the minute you make up your mind to handle Kalamazoo furnaces. Don't delay. Let us hear from you by return mail and complete information will be sent you at once.

Kalamazoo Stove Co.
Kalamazoo - Mich.

**You make a
good profit—
and a good
friend—and
"booster"—
whenever
you place a
Kalamazoo
Furnace.**

**"A Kalamazoo" And Gas
Trade Mark Registered Direct to You Stoves Too**

roofs, floors, side walls, ceilings, partitions, columns, beam protection, etc. It is made regularly in 28, 26 and 24-in. gauges but can be furnished in special gauges and on special order from galvanized sheets and from American ingot iron. When desired it will be curved at the factory to any desired radius 12 inches or larger.

The company has issued a handsome new catalogue known as the "Fireproofing Hand Book," which describes fully this new product as well as its "Trussit" or corrugated expanded sheet metal for fireproof walls and partitions, metal lath and other products. The catalog contains numerous illustrations of buildings completed and in the course of construction in which the company's reinforcing and fireproofing materials are used and numerous construction details and various other information as well as specifications which will be of interest to architects, builders, contractors and engineers.

The Stearns Floor Scraper

Among the latest candidates for popular favor in the way of floor surfacing machines is the Stearns' Floor Scraper No. 10, made by E. C. Stearns & Co., Syracuse, N. Y., and a general view of which is presented in Fig. 5 of the cuts. The handle is adjustable and with its braces is 38½ in. long; the wheels are 5 in. in diameter and rubber tired, so as not to mar the floor, and the finish is in aluminum. The wheels are set in and the knife can be run close up against a wall when the scraper is in use. The knife which is 6 in. wide, scrapes the floor when the scraper is drawn towards the operator and it is firmly clamped in the scraper. The weight of the device is such that as nearly all of it rests on the knife it tends to prevent vibration or "chatter," thus doing away with all wavy effects on the floor. In adjusting the scraper there are only two screws to manipulate, thus rendering the device simple in operation. The weight of the scraper complete is only 100 lbs.

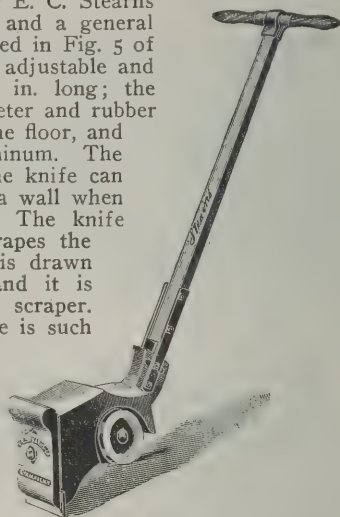


Fig. 5—The Stearns Floor Scraper

Winners in "Sliding Door" Contest

Our readers have been advised in these columns of the fact that the Richards-Wilcox Mfg. Company, Aurora, Ill., has been offering prizes for the best articles dealing with the "Advantages and Conveniences of Installing Sliding Doors in the Modern Home." In the July issue of "DooR-Ways," the house organ of the company, announcement is made of the winners in this contest, the judges having been L. W. Harstig, of Sargent & Co., R. J. Kleinsmid, of the Yale & Towne Mfg. Company, and W. J. Patterson, of P. & F. Corbin. After carefully reading the many articles submitted and considering the many strong points advanced in favor of installing sliding doors in the modern home, the judges awarded the first prize of \$50 to Miss Blanche Ayers, of Redkey, Ind.; the second prize of \$30 to John P. Higgins, of the Gregg Hardware Company, Detroit, and the third prize of \$20 to H. H. Cahoon, architect, 1105 May Building, Pittsburgh, Pa. The July number of "DooR-Ways" refers to other articles and their authors submitted in the contest and worthy of mention.

It may not be without interest to many of our readers to present the article which was awarded first prize, and this we do herewith.

"The sliding door is more convenient, more artistic, and more durable than the ordinary swinging door, and also has advantages over the plain cased opening.

"A sliding door takes less space when open than the hinged door. When the door is open it is entirely out of the way, and the space which would be used for the door to swing back, can be otherwise utilized. The appearance of the room is also improved by having sliding doors, as the hinge doors when open are clumsy.

"When a door is once hung with a good reliable hanger, and has a good, substantial track on which to run, there is no trouble with the door sagging. If any trouble arises it can be remedied by adjusting the hanger without taking down the door. A door on hinges, when out of plumb has to be taken off and refitted and rehung.

"The sliding door is more economical than the plain cased opening in the long run. There can be a saving in fuel, especially in houses heated by stoves. The opening can be closed and only closed up portion of the house heated. In cleaning one room can be cleaned without

(Continued on page 50)

Get Sears, Roebuck and Co's Price ON A COMPLETE HOUSE

Lumber List and Our Book of Modern Homes MAILED FREE

Any shrewd lumber buyer can easily understand why we are in a position to undersell anyone else on lumber and mill work. First of all, we buy raw timber direct from the greatest timber tracts in America. Second, our mills are located right in the heart of lumber producing districts. Third, we buy and sell in immense quantities. Competition is keen among forest owners to secure our immense business. We secure every possible discount—we pay spot cash.

Fourth, we sell **Direct From the Mills**

to the consumer. You pay for lumber and mill work alone—not three or four extra profits. Fifth, you buy in any quantity—a bundle of shingles or a trainload assortment. Sixth, we sell first grade, second grade and third grade, and *call them by their right grades*. No one ever bought second grade lumber from us under the impression that it was first grade. Seventh, you are dealing with Sears, Roebuck and Co., the largest mercantile establishment in the world. Eighth, our guarantee makes your satisfaction absolutely certain—either with the merchandise you purchase or by our returning your money on request.

This Book FREE



LUMBER

TYPE OF UP TO DATE BUILDINGS IN WHICH OUR LUMBER IS USED



Our Modern Home No. 127, Built at Peoria, Ill.

Two Big Lumber Plants to Ship From
Capacity, Over Thirty Carloads a Day

Two big plants are shown in this illustration, each with its own set of tracks and loading facilities. The plants are situated in a wooded area, and the surrounding landscape is hilly. The text below the illustration states: 'The two big plants are shown in this illustration, each with its own set of tracks and loading facilities. The plants are situated in a wooded area, and the surrounding landscape is hilly.'

REMEMBER WE NOW SHIP LUMBER IN ANY QUANTITY

A FEW BUNDLES



A CARLOAD



OR A TRAINLOAD. WE SHIP PROMPTLY AND GUARANTEE SATISFACTION



ROEBUCK AND CO. CHICAGO ILLINOIS

Isn't it worth a 2-cent stamp to mail the coupon for our money saving Lumber List, beautiful Book of Modern Homes and Mill Work Catalog?

MAIL COUPON NOW

Mill Work Catalog, Book of Modern Homes and Lumber List—All Mailed Free

Read This:

Many books, not nearly as good as this, sell for \$1.00 to \$2.00. Yet we send our Book of Modern Homes free. Many of the illustrations are in actual colors. Over 100 Modern Homes are shown, giving the builder or contractor a wide selection. And the prices of lumber and mill work will amaze you.

Be sure to send us the coupon or a postal for this great book at once. You cannot afford to miss it, no matter how many other books you have.

You cannot afford to buy a dollar's worth of lumber or mill work until you first see our new Lumber List, Mill Work Catalog and Book of over 100 Modern Homes. You will be amazed at the savings we make for our customers. With the book we send proof positive—absolute evidence—showing what we have saved for hundreds of others. If you have your own best interests at heart you will mail the coupon or a postal card now. Please request Lumber List No. 77B15.

Sears, Roebuck and Co.
Chicago

SEARS, ROEBUCK AND CO., CHICAGO. 77B15

Please send me the books I have checked below.

☐ Lumber List ☐ Mill Work ☐ Modern Homes

Name.....

Address.....

City..... State.....

Black Diamond File Works

ESTABLISHED 1863

INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file
user upon application.

G. & H. Barnett Company
Philadelphia, Pa.

Owned and Operated by Nicholson File Company.

having to clean all the house if there are doors to close the openings. The sliding doors answer every purpose of the plain cased opening, and have the advantage of having doors that can be closed when desired."

A New Roofing Tile.

A thoroughly modern and up-to-date factory for the manufacture of roofing tile has just been completed by the Acme Roofing Tile Co., Des Moines, Iowa. The tile, which is intended both for roofing and promenade purposes, is made from shale, burns a natural deep rich red color and is offered in standard shapes and patterns. In addition to natural red tile the company can furnish glazes in green, brown, yellow, blue, black, white and mottled, most of which colors are dull matt or highly polished surface. A sample and a copy of the company's catalogue can be secured on application to the address given.

Brick Fireplaces.

The open fireplace is such an important feature of our modern homes that it is not surprising to find manufacturers of brick especially intended for use in their construction sending out some unusually attractive literature bearing upon the subject. One of the latest *brochures* dealing with open fireplaces is that just issued under the above title by the Thomas Moulding Brick Co., Chamber of Commerce Building, Chicago, Ill., which is an artistic production and an advance in trade literature. It is a work of thirty-two pages, of which the right-hand ones carry designs in colors of brick fireplaces and their immediate surroundings in the room in which they are shown. In each case is a plan of the fireplace with dimensions, and on the facing or left-hand page is a brief description with price. The work is beautifully executed and cannot fail to prove of interest and value to every architect and builder into whose hands a copy may come. In a supplementary catalogue are special designs and prices on andirons, grates and dampers. In the execution of the matter the illustrations were prepared by B. J. Beck, the architectural details by William J. Wuehrmann, and the design and text by Frederic W. Donahoe.

TRADE NOTES

E. J. Johnson, the slate operator of Park row, New York, has purchased a new slate quarry at Pen Argyl, Pa., from which he will produce black roofing slate, structural slate and slate blackboards for schools and institutions. This makes the fourth quarry now operated by this house, which has for years specialized on black, purple, green and red slate.

The El Starr Mfg. Co. makes announcement that after September 1 its business will be conducted under the style and title of Star Specialty Mfg. Co., 227 to 233 West Erie Street Chicago, Ill.

The panel picture which embellishes the August card calendar sent out by the Richards-Wilcox Mfg. Company, Aurora, Ill., is entitled "A Subject for Reflection." It represents the charming young lady who is posing for the series of card calendars of the company, attired in bathing costume and in a partially recumbent attitude is gazing at her reflection in the clear waters of a swimming pool. The execution is excellent and the picture is one which will insure for the calendar a place for it upon the desk of the recipient. Upon the back of the card is another "subject for reflection" in the way of an illustration of the Richards-Wilcox Parlor Door Hanger.

A booklet telling in as few words as possible why and how Dixon's boiler graphite does its work, has just been sent out by the Joseph Dixon Crucible Company, Jersey City, N. J. Every builder operating a large woodworking establishment knows how much fuel is saved annually by keeping the boiler tubes and shell clean, and how much time and labor is saved in cleaning the boiler. He will, therefore, be interested in what the booklet in question has to say regarding the matter. The company is the oldest and largest manufacturer of graphite and graphite products in the world and the claim is made that anything which bears the stamp of "Dixon" is the best that can be produced for the price.

A large plant for the manufacture of fireproof tile will be erected at Mogadore, Ohio, by L. W. Camp & Co.

The last issue of *The Abrasive Age* devoted to the better use of abrasives, and published by the Carborundum Company, Niagara Falls, N. Y., contains a most interesting article illustrating and describing the method of mak-

(Continued on page 52)

**THE
SIMONDS
SAW**

is built on honor. Every saw which leaves the Simonds factories is inspected and its quality is guaranteed.

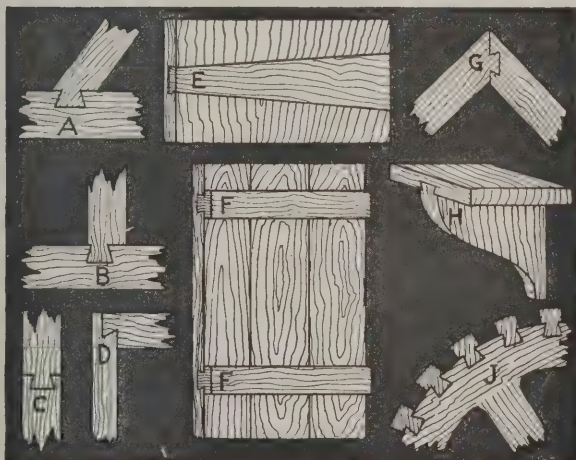
**Ask Your
Dealer**

SIMONDS MFG. CO.
FITCHBURG, MASS.
CHICAGO, ILL.



A Plane that will at one setting cut a dovetail groove and in the other setting a dovetail tongue to match.

A most valuable addition to the Tool Chest of Pattern Makers, Cabinet Makers, Carpenters and Woodworkers in general.

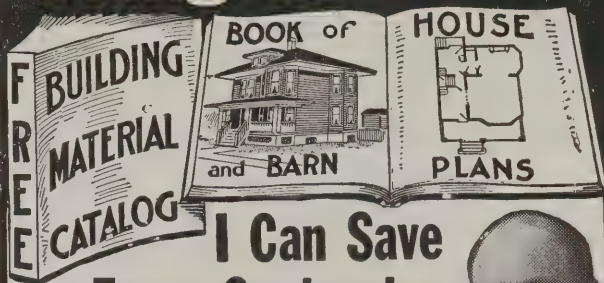


A Few Samples of Work That Can Be Done With Its Use.

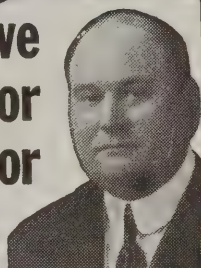
A circular containing complete description of the Tool as well as valuable suggestions as to the use of dovetail joints, will be mailed upon request.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

Going to Build?



I Can Save Every Contractor Who Will Send for These Books BIG MONEY



Every contractor, carpenter and builder should have these two books. One is our catalog which features everything needed in lumber, flooring, doors, windows, porchwork, moulding, building paper, hardware, paint, roofing—all kinds, at wholesale prices that save one-third to one-half.

The other is our handsome Plan Book showing views and floor plans of over 50 houses, barns and garages priced from \$80 to \$6,000. We guarantee everything to be brand new stuff—no wreckage. We also guarantee safe delivery and satisfaction. Don't pay local dealers' prices when you can buy from manufacturers direct and save money.

Mail the coupon or a postal today for these books—be independent of local men and have your choice of

Over 8000 Bargains Like These

100 ft. Quarter Round Dealer's Price \$1 Our Price 30c

Clear Lattice
30c per 100 ft.

Wearwell Paint
Perfect, guaranteed house paint—Gal. only
\$1.20
in 5 gal. kits. Also packed in 1/4 gal. up to 50 gal. barrels. We have all kinds of paint at wholesale prices.

Panel Doors \$1.07 up Glass Doors \$1.77 up

Hardware

Economy Rubber Roofing
1 Ply, 35 lbs., guaranteed 5 years **\$1.10**
2 Ply, 45 lbs., guaranteed 7 years **\$1.35**
3 Ply, 65 lbs., guaranteed 10 years **\$1.60**
Rolls Contain 108 Square Feet

Doors
Glazed Windows of all kinds Ready for quick shipment—2 light 68c up; 4 light 77c up; 12 light 83c up.

Door and Window Screens

We can supply any kind and style. Rustless galvanized, bronze or black wire—clear pine and oak frames. Window screens for 24x28 2 light widows full size 79c. Catalog shows all sizes and prices.

Send in Your List of Items for Estimate.
When we know exactly what you want, we can tell you just what it will cost with all freight charges prepaid by us direct to your railroad station.

Economy Rubber Roofing

In writing ask for Catalog No. 45 and if you expect to build and want plan book also, ask for Plan Book No. 55

Chicago Millwork Supply Co., 1424 W. 37th St., Chicago, Ill.

TEAR OFF AND MAIL TODAY

Chicago Millwork Supply Co.,
1424 W 37th Street, Chicago, Ill.

Please send your books to

Name

Address

Catalog No. 45

Plan Book No. 55

YOUNG MEN

Prepare for

Good Positions In Carpentry and Building

Class forms in September. Nine months course. Low expenses

For Illustrated Circular, Address

PRATT INSTITUTE, Dept. G., Brooklyn, N. Y.

E

Improved Quick and Easy Rising Steam
Electric and Hand Power Safety

ELEVATORS

AND DUMB WAITERS
Automatic Hatch Gates
Send for Circulars

KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.

Kansas City, Mo., 717 Commerce Building

Gus Taliaferro, Oklahoma City, Okla.

Branch Offices: 136 Liberty St., N. Y. 108 11th St., Omaha, Neb.



Producers of

Roofing Slate

SLATE BLACKBOARDS

E. J. JOHNSON

38 Park Row
New York

Quotations delivered
anywhere

Slaters' Supplies
Snow Guards

Correspondence Solicited

TILE Unglazed, Encaustic, Ceramic, and Vitrified Tile

For Floors in Stores, Churches, Depots, Kitchens, Halls,
Porches and wherever Durable and
Sanitary Floors are required. Also for Fireplaces.

STAR ENCAUSTIC TILE COMPANY

Bluff St., near Gist St., Pittsburgh, Pa.

1853

BUCK

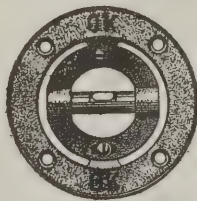
1913

BUCK BROS.

Buck Brothers' Tools are LASTING tools—
they keep their edge.

We make a full line which includes bevel edged
chisels, socket and tang butt chisels, gouges,
plane irons, drawing knives, nail sets, screw
driver bits, and carving tools. Catalogue ex-
plains—get it at once.

BUCK BROS., Milbury, Mass.



ACTUAL SIZE 3 1/4".

CLIMAX OF SIMPLICITY

The O.K. Adjustable Plumb or Level Fixture
to be attached to 6 or 8 ft. plumb staff or
straight-edge for plumbing door jambs, stud-
ding; leveling joist, foundations, etc. Made
of high grade aluminum.
Don't waste your time and patience with the
cumbersome plumb-bob. Send today for the
O.K. Fixture—50c each or \$5 per doz. post-
paid, P.O. or express money order.

S. L. Stratton & Co.,

Box 776 - Columbus, Ohio.

ing saws at the extensive plant of E. C. Atkins, Indian-
apolis, Ind. It is the story of a trip through this mam-
moth plant, and emphasis is laid upon the important part
which is played in this industry by grinding wheels. An-
other story describes a visit to a Grand Rapids plant,
where beautiful furniture is manufactured with incidental
reference to the selection of abrasive papers which are
used in finishing the furniture.

Van Guilder Hollow Wall Company, 712 Chamber of
Commerce Building, Rochester, N. Y., has just issued what
is known as Bulletin No. 12 relating to the system of wall
construction which it advocates. Reference is made to the
Van Guilder hollow wall machines and illustrations are
presented showing some of the work which has been exe-
cuted with them. There are a number of testimonial let-
ters showing the estimation in which the machines are
held by those who have practically demonstrated their
merits.

C. H. Richartz & Son, building contractors, have just
occupied their new quarters on Central Avenue, Bergen-
field, N. J., opposite Heads' Bergenfields Nurseries, and
will be glad to receive catalogues and price lists of all
kinds of materials and fixtures used in connection with
building construction.

National Tube Company, Frick Building, Pittsburgh,
Pa., makes the announcement that on August 1 it entered
the electrical conduit field. It has contracted with the
National Metal Molding Company and the Safety-Armo-
rite Company, both of Pittsburgh, Pa., to manufacture and
sell this product for the National Tube Company as its
agents under their various brands. The National Tube
Company has also decided to sell this product on the
"Pittsburgh Basing Discount" plan in the same manner
as all wrought pipe for other purposes has been sold for
the past 13 years.

What is said to be the largest corporation of its kind
in the state of Arizona and which follows the business of
erecting dwelling houses, in the Home Builders, Inc., at
Phoenix. The Company owns its own mill and turns out
all the cabinet work and inside finish required for its own
contracts. Recent improvements in its equipment include
an "American" three-drum 49-in. sander and an "Ameri-
can" hollow chisel mortiser made by the American Wood-
working Machinery Company, Rochester, N. Y.

The Berger Mfg. Company, Canton, Ohio, is distributing
with its compliments copies of the pamphlet report of
tests of partitions by fire and water made in June last
year under the direction of Virgil D. Allen, city inspector
of buildings, Cleveland, Ohio. Our readers will recall
that at the time these tests were made a summary of them
was published in *The Building Age*.

The San Francisco Cornice Co., San Francisco, Cal., has
been recently organized and is now conducting its business
at 525 Market street, that city, under the name of the
United States Metal Products Co., of the Pacific Coast.
The company conducts a general sheet metal business, in-
cluding the making of rolled molding, kalamein work,
hollow steel and bronze work, special and fireproof doors,
windows and fittings.

A feature of the August number of "Graphite" published
by Joseph Dixon Crucible Company, Jersey City, N. J., is
a list of customers who have used Dixon's Silica Graphite
Paint in the Southern states. The point is made that the
list speaks for itself as it covers the largest concerns and
all kinds of metal structures. Among other features is an
article enumerating some of the unusual uses of Graphite;
a brief description with illustration of the Lake View
Building in Chicago, also of a new steel skeleton frame
structure intended for importers and dealers in agricul-
tural implements and machinery in Buenos Ayres. In
both cases the steel work was protected with Dixon's
Silica Graphite paint.

Olaf K. Killingstad, architect, has just located in his
new offices, 526 Wisconsin Street, Racine, Wis., and would
like to receive samples and catalogues from manufacturers
of materials and supplies entering into building con-
struction.

The National Surfacing Machine Company, Toledo,
Ohio, has been incorporated with a capitalization of
\$25,000 by C. E. Haynes, C. P. Taylor, Frank E. Foster,
Frederick Hofer, Jr., and George W. Skelding.

The Edgar M. Murray Plastering Company of Albany,
N. Y., has been incorporated for the purpose of manufac-
turing a new roofing and fireproofing material.

A feature of a late number of *Chain Belt*, published
each month by the Chain Belt Company, Milwaukee, Wis.,

(Continued on page 54)

No. 15

This Try Square Cannot Get Out of True

THE blade in this try square consists of a solid piece of steel in L-shaped form. One arm extends through the slotted stock, flush with back, and is fastened with heavy brass rivets. The stock is practically a part of the blade, which gives perfect rigidity, and makes it impossible to get out of true. Trued inside and out. The stock is of Rosewood, polished, with a flush, heavy brass face plate. This is fastened to the stock by a special method which insures security.

Disston Saws, Tools and Files are sold by all progressive hardware dealers.

HENRY DISSTON & SONS, Inc.

Keystone Saw, Tool, Steel and File Works

PHILADELPHIA, U. S. A.



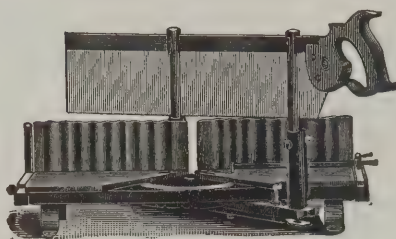
**SOMETHING EVERY
CARPENTER NEEDS**

At your dealer's, or if you have trouble getting it, write us direct. Write for prices.

SATISFACTION GUARANTEED

Goodell Mitre Box

**Made of STEEL—Cannot Break
First in Quality and Improvements**



Automatic Stops for holding up saw.

Corrugated Backs Graduated.

Gauge for Duplicate cuts and many other features.

If you want the best you will take no other.

Send for Circular K.

GOODSELL MFG. Co., Greenfield, Mass.

INTRODUCTORY TRIAL OFFER

If the SELF-SETTING PLANES are not sold in your town and you write us saying "I saw your trial offer in Building Age," we will send you particular, a carpenter's pencil and our \$1.00 Certificate, which we will receive as \$1.00 in payment for a SELF-SETTING PLANE, as stated in our \$1.00 Certificate, and if this S. S. Plane is unsatisfactory and returned to us at our expense, we will send you \$1.00 more than you sent us, as the \$1.00 Certificate says.

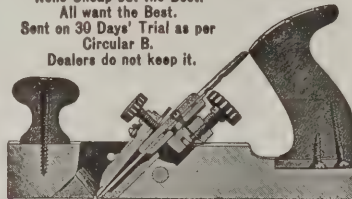
THE BEST IS THE CHEAPEST

None Cheap but the Best.

All want the Best.

Sent on 30 Days' Trial as per Circular B.

Dealers do not keep it.



O. K. ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained, catty, knurley, knotty, hard or soft wood you can find. THAT IS FREE FROM SAND OR DIRT. If it is not worth to YOU, OR YOUR MEN, TWICE ITS COST, return it at our expense as above stated.

If you send us the addresses of ten carpenters, no matter where they live, we will send you another hard, tough carpenter's pencil. Give the SELF-SETTING PLANE a chance to PROVE ITS WORTH. If it FAILS, return it and we will return your money. GAGE TOOL CO., Vineland, N. J.



ORDER THE "HYNAILER" 75c

Best single claw hammer ever made. Holds the nail for high, low or far across driving. Grips plain part of nail so strongly as to pull the head of nail clear through the wood.



ORDER THE "DOUBLE CLAW" \$1

Best Hammer ever made. Holds the nail for starting to drive where you can not reach with two hands. Pulls the nail out straight without a block.

DOUBLE CLAW HAMMER CO.

453 BROADWAY, BROOKLYN, N. Y.

YES!

I certainly do want to learn how to get the lengths and cuts of rafters for seventeen different pitches of roof by the rule you

stamp on your squares, so send your little book on Rafter Framing free to me.

Name
Address

NO!

I do not care to learn any more about Roof Framing. I will admit it takes me considerable time to figure out the lengths and cuts of common, hip, valley, and Jack rafters.

Name
Address

NICHOLLS MFG. CO., Ottumwa, Iowa

The Yankee (A Compound Level)

Just the thing for the Arch.-Builder
An accurate level for moderate cost



Runs Horizontal
and Vertical
Angles.

Sold guaranteed by
**Frost-Adams
Co.**

37 Cornhill, Boston,
Mass.

Write for latest cata-
logues.

Don't Break Your Back

Trying to work in unhandy corners
with unhandy tools.



Automatic Star Pocket Borer No. 8

is the ideal tool for close quarters—
made of steel, handsomely nickeled,
and carries 8 drill points from 1/16 to
11/64", and a screw driver bit. Com-
pressible to handy pocket size.

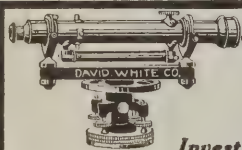
A compact, serviceable tool (not a
toy) which no mechanic can afford to
be without.

Write for prices and complete tool
catalog.

MILLERS FALLS COMPANY

28 Warren St.

New York



Investigate !!!

White's Improved Level

before buying elsewhere.

This level is especially designed to meet the
contractor's every need in the level line. Over
3000 giving perfect satisfaction. Telescope long
and powerful and will detect an error of 1/16"
in 300 feet. Shipped on approval to your ad-
dress, express charges prepaid. Write today for
circular X, giving price and full information.
Written guarantee with each level.

DAVID WHITE COMPANY

Dept. B

419 East Water St.

Milwaukee, Wisc.



is an illustrated article dealing with the manufacture of
steel castings, the plant in question being the one from
which the company buys its supplies of this nature. An-
other illustrated article relates to the use of an automobile
engine for a concrete mixer. Naturally there is much to be
found about the "Chain Belt Mixer" manufactured by the
Chain Belt Company, Milwaukee, Wis.

Thomas Morton

245 Centre Street
NEW YORK

Copper Cable

Steel Cable

Champion Metal

Steel Champion

SASH CHAINS

CHAINS

For Suspending Heavy Doors,
Gates, Etc.

All of SUPERIOR QUALITY



The Smith & Egge Mfg. Co.

BRIDGEPORT, CONN.

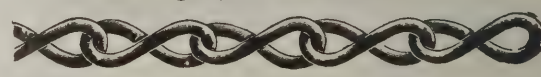
Sash Chains



Cable Chains



Jack Chains



Manufacturers of "GIANT METAL" Sash Chains

Manufacturers of "RED METAL" Sash Chains
Cable Chains, Jack Chains, Bell Hangers' Chains and
Plumbers' Chains. Made in Brass, Copper and Steel.

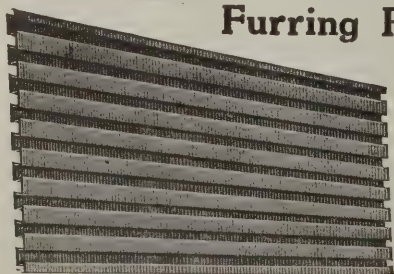
WRITE FOR CATALOGUES AND PRICES.

We are the ORIGINATORS of SASH CHAIN as
SUBSTITUTE for sash cord. In use over thirty
years. Capacity of our chain plant 30 miles per day.

Berger's

Ferro-Lithic

Reinforcing
and
Furring Plate



Write
for
Cata-
log

THE BERGER MFG. CO.

CANTON, OHIO

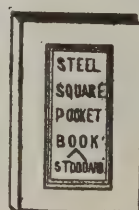
For the best service address nearest branch.

New York
St. Louis

Boston
San Francisco

Minneapolis
Philadelphia

On the Square



Here is a little book which is a
veritable gold mine of informa-
tion on the use of the square. It
shows the actual cut with the
square properly set so that you
get it at a glance.

159 Pages. 112 Figures. Price 50c.

Send for our catalog of selected books on all
branches of the building trades.

BUILDING AGE BOOK DEPARTMENT

239 West 39th Street, New York

OCTOBER

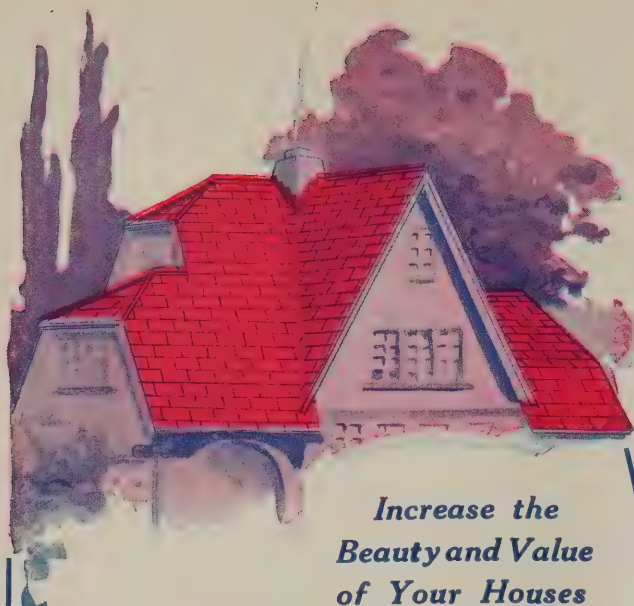
TEN CENTS

BUILDING AGE



ARTHUR WEINDORF.
1913

CONTAINING PLANS FOR ABOVE HOUSE



*Increase the
Beauty and Value
of Your Houses*

by using

Hudson Asphalt Shingles

IN RED AND GREEN COLORS

Beautiful in appearance. They can't rot or fade, being surfaced with crushed slate in all its natural colors. Neither Paint nor Stain is required. Easy to Lay and Inexpensive. Suitable for any house or building where shingles are suitable. Can be used for siding also. Send for samples.

ASPHALT READY ROOFING CO., 9 Church Street
New York, N. Y.

Special Regarding Distinctive Parquet Floors of Foreign Woods

Aside from the innumerable combinations which may be derived from our native woods and not incidentally the vast assortment of Wood-Mosaic patterns, particular note should be made of the facts below, pertaining to hardwood floors of par excellence.

We carry more than fifty varieties of foreign woods, some of them rare and costly, affording in their natural, unstained beauty almost every color except bright blue. Ebony, black and golden striped; green and purple Mahajua; Mahogany, both red and white; brown Teak; mottled English Oak; tawny striped Tigerwood and delicately veined Tulip and Pau-de-oro, present a range of tints to the decorator which enables him to follow out any color scheme he may wish.

Our library contains books of design and collections of notable residences at home and palaces abroad to aid in the production of fine effects for architects and others wishing to carry period schemes of decoration through the floors as well as the rest of the building.

We are ready at all times to confer with the interested.

Wood-Mosaic Company

32 Hebard St. Rochester, N. Y.

Saw Mill and Flooring Factory: New Albany, Indiana
Sales Office and Parquetry Factory: Rochester, New York



Better In a New Way!

For years carpenters have known that auger bits which bore fastest, cut cleanest, do not choke, and which may be sharpened oftenest are the

Russell Jennings Auger Bits

Now these have been improved in the only possible way—the shank has been made round and a new brace chuck made to hold it. These new bits have been called "Precision Tools." They are the only bits that won't pull out of the chuck or work loose or wobble.

*Any good hardware store carries the
Russell Jennings line*

Russell Jennings Mfg. Co.
Chester, Conn.

21-118

A New Idea and A Good One



FLINTKOTE
Rex-tile
TRADE-MARK
SHINGLES

As roofings go, the materials of which Rex-tile Shingles are made are old—they have been on the market over fifteen years. But the bent-under end on Rex-tile Shingles is the NEW IDEA that has solved the shingle problem.

This bent-under end is for nailing and gives the thick effect at the butt—it prevents warping, splitting and cracking and makes it impossible for the exposed part to curl up or blow up.

Made in both red and slate colors. Easy to lay and long to stay—and the shingles you ought to know all about as quickly as possible.

Write for samples, prices and full information.

FLINTKOTE MANUFACTURING COMPANY

98 Pearl Street, Boston, Mass

New York

Chicago

New Orleans

THE BUILDING AGE

NEW YORK, OCTOBER, 1913

SUBURBAN COTTAGE WITH OPEN SLEEPING PORCH

The Square House the Most Economical to Build—Some Technical Details of Interest to the Architect and Builder—Cost \$4500

THE combination of siding and stucco in the exterior treatment together with economy of construction and compact arrangement constitute features of the cottage here illustrated, which are likely to command more than passing notice on the part of

closet, paneled wainscoting and beamed ceiling. The varied assortment of miscellaneous constructive details afford the reader an excellent idea of the construction employed.

While the house is nearly square in plan and thus of

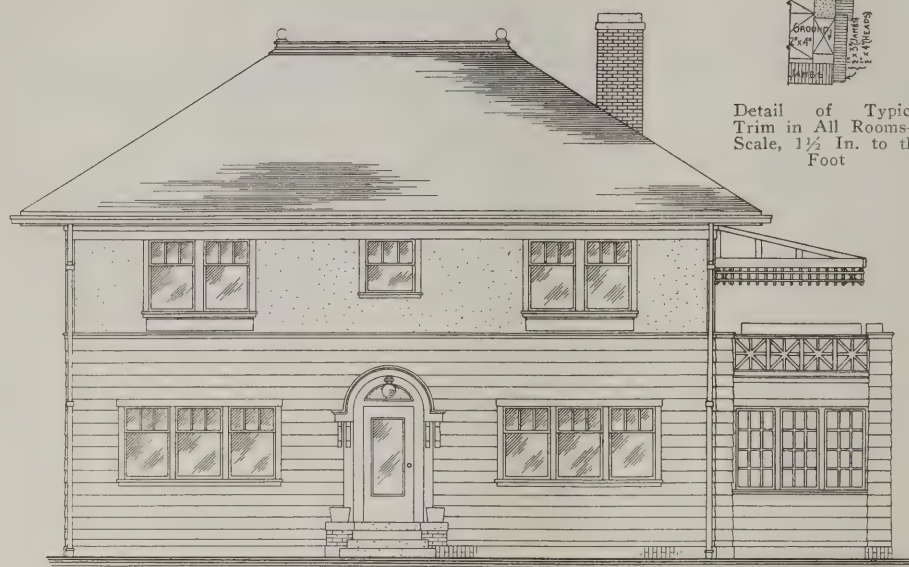


Suburban Cottage with Open Sleeping Porch—View Showing Street Front—Architect Perry W. Swern. Oak Park, Ill.

many of our readers. The white trim, the shingled roof and the living and sleeping porches shown at the extreme right are other features which come in for consideration when studying the design as a whole.

The various half-tone engravings presented upon this and pages which follow clearly indicate the appearance of the finished structure as well as the treatment and furnishings of the interior, especially the living room and the dining room—the latter with its built-in china

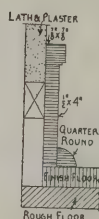
the best outline for economical erection, it is placed with the longer side toward the street and is entered by way of the recessed portico which opens into the main hall with which all rooms on the first floor directly communicate. At the right is a spacious living room extending entirely across one end of the building and from which through French casement doors the living porch is reached. At the far end of the living room is an open fireplace with bookcases on either side



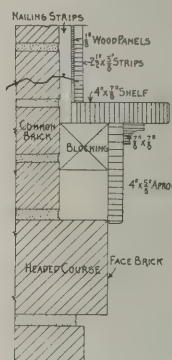
Front Elevation, Showing Living Porch Enclosed with Sash—Scale, $\frac{3}{32}$ In. to the Foot



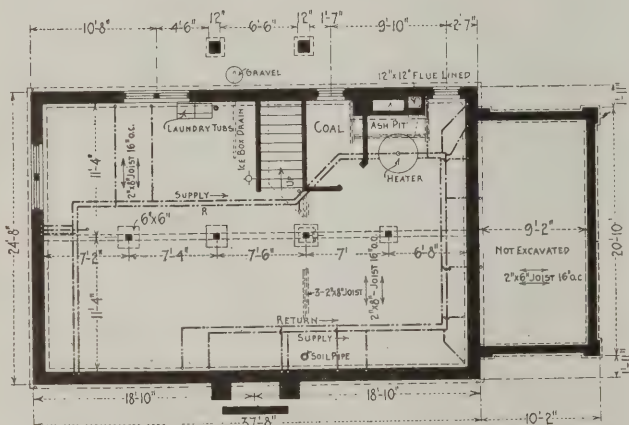
Detail of Typical Trim in All Rooms—Scale, $1\frac{1}{2}$ In. to the Foot



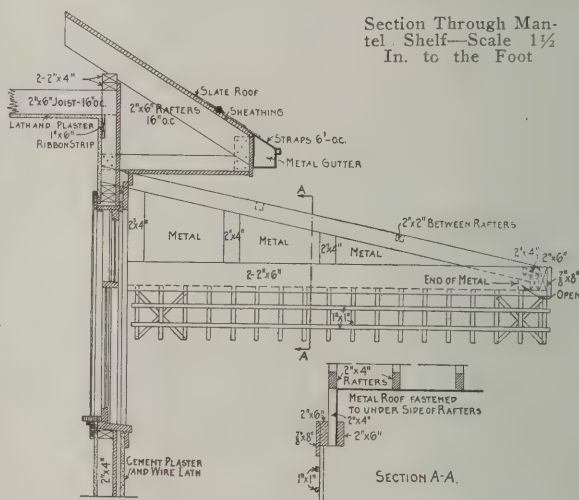
Typical Base in All Rooms—Scale, $1\frac{1}{2}$ In. to the Foot



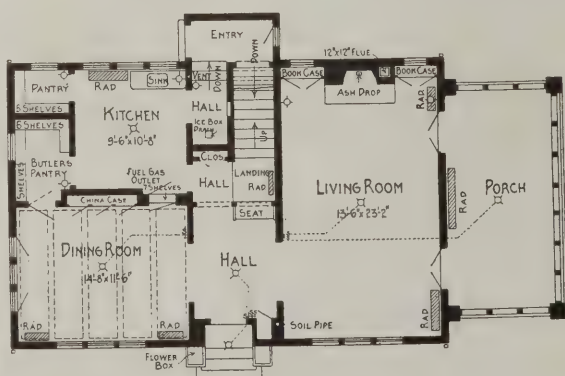
Section Through Mantel Shelf—Scale $1\frac{1}{2}$ In. to the Foot



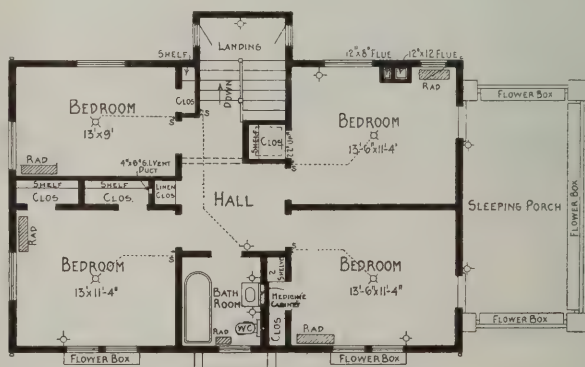
Foundation Plan Showing Position of Laundry and Heater—Scale, $\frac{1}{16}$ In. to the Foot



Section Through Second Floor Showing Typical Wall Construction, also Details of Canopy Over Sleeping Porch—Scale $\frac{1}{4}$ In. to the Foot



Main Floor Plan—Scale, $\frac{1}{16}$ In. to the Foot



Second Floor Plan, Showing Sleeping Porch—Scale $\frac{1}{16}$ In. to the Foot

and a window directly over each. At the left of the hall is the dining room with its built-in china case and triple windows and beyond is the kitchen with which communication is established by means of a well-equipped butler's pantry. In the rear hall is placed the

joists being 2 x 8 in.; the second floor joists 2 x 10 in. and the porch floor joists 2 x 6 in., all placed 16 in. on centers. The studs are 2 x 4 in., also placed 16 in. on centers and the ribbon strips are 1 x 6 in. The roof joists are 2 x 6 in. All headers and trimmers are doubled around the stair well. The studs are doubled at all openings, angles and corners and all joists are bridged with continuous rows of 2 x 3 cross bridging.

The outside frame is covered with No. 1 shiplap laid with close joints. The sheathing, including the underside of all soffits, cornice and projections, is covered with heavy rosin-sized building paper, which is well lapped at all joints and openings and securely fastened in place. This in turn is covered to the height shown in the half-tone elevation with $\frac{7}{8}$ x 10-in. cypress boards.

Over the sheathing paper at the second story $\frac{7}{8}$ -in. furring strips placed 12 in. on centers are nailed and to these is fastened "Kno-Burn" expanded metal lath. To this was applied three-coat cement plaster work, the first coat being composed of lime, hair and sand in the proper proportions, to which had been added 10 per cent. of Portland cement. The second coat was made

of two parts sand and one part Portland cement and then "rough-casted" with Portland cement and clean cinders to give the proper texture. The roof of the house is covered with shingles.

The wall plates are fastened to the main walls by means of $\frac{3}{8}$ -in. anchor bolts, 18 in. long and properly bolted in place.



Suburban Cottage with Open Sleeping Porch—View in Main Hall Looking Toward the Stairs and Showing Living Room to the Right

ice box and three steps below is the entry from which stairs lead to the cellar.

The main flight of stairs rise from the central hall and land on the second floor at a point from which all the sleeping rooms and bath room are readily accessible. This main flight is lighted by two casement windows at the broad landing half way up.

On the second floor each of the sleeping rooms is provided with clothes closet and is heated by a radiator, the position of which is clearly indicated on the plan. The position of the bath room might be criticised by some in that it is placed directly over the front hall with a portion of it extending over the dining room. This is not likely to prove embarrassing, however, if noiseless fixtures are used and sound-proof floors are provided.

Over the end porch of the first story, which in the elevation is shown enclosed with glass, is a commodious sleeping porch directly accessible from each bedroom on the second floor. It is protected by a canopy, the details of which are presented on page 440. The picture on page 439 shows the cottage without the canopy and the porch without its enclosing sash.

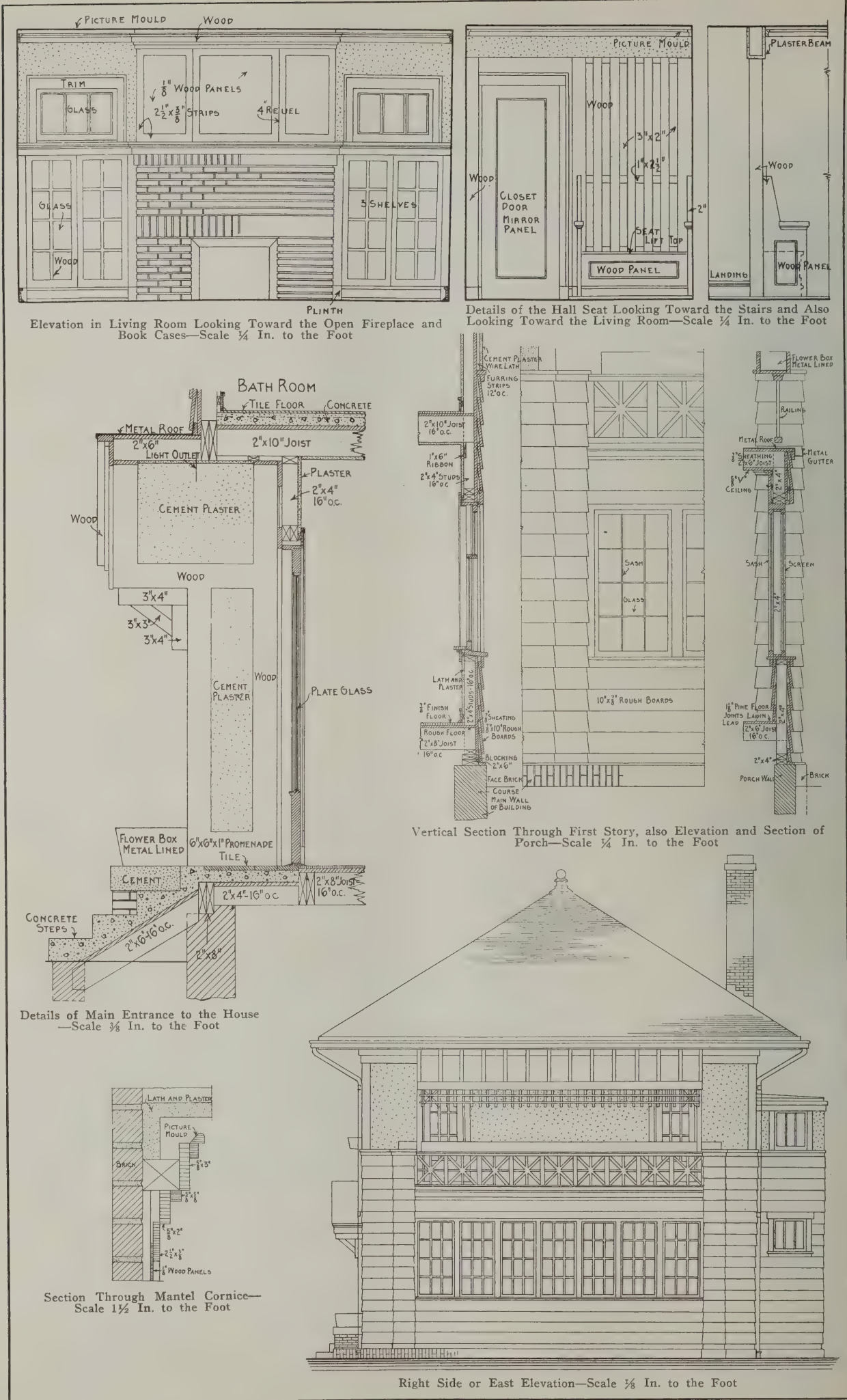
According to the specifications of the architect the footings are concrete composed of one part cement, three parts sand and five parts broken stone. The outside surfaces of the foundation walls around the excavated portions where they come in contact with the earth are plastered with a coat of cement-mortar $\frac{1}{2}$ an inch thick, the composition of the mortar being one part Portland cement and two parts sand.

The framing timbers are of hemlock, the first floor



A Photographic View Showing the Dining Room End of the Cottage

The basement has a 3-in. cement and concrete floor laid upon a bed of cinders and finished with a $\frac{1}{2}$ -in. top dressing of one part Portland cement and two parts Torpedo sand. The floors of the first and second stories are double, the under floors being of 1 x 6-in. dressed boards securely nailed to each bearing and upon which is a finish floor of $\frac{7}{8}$ in. oak, with



Miscellaneous Constructive Details of a Suburban Cottage with Open Sleeping Porch

the exception of the kitchen and pantries, which have maple floors. The rooms of the second story, excepting the bath room, have a $\frac{7}{8}$ -in. oak floor. The bath room has an unglazed white tile floor.

The porch floor is of $1\frac{1}{8} \times 2\frac{1}{4}$ -in. white pine with joints laid in white lead and thoroughly blind nailed to each bearing.

The treads of the stairs are $1\frac{3}{8}$ in. thick and the risers $\frac{7}{8}$ in., the treads being tongued into the risers and the risers gained into the treads and strings, wedged and glued together and strengthened by angle blocks and set not over 20 in. on centers. The front stairs are of the same finish as the first floor hall.

The exterior doors are $1\frac{3}{4}$ in. thick, while the remaining ones are $1\frac{3}{8}$ in. thick. The entrance door is

thinned with turpentine to which the necessary amount of Japan dryer was added to give an elastic durable finish. The bath room and one bedroom are finished in white enamel.

The glass in the first and second stories is "A A" double thick, excepting the front entrance door, which has plate glass, and the doors in dining room to pantry and closet, which have single chipped glass divided, as shown in the details.

All exterior woodwork is painted two coats and all metal work inside and outside has one coat of mineral paint and two coats of lead and oil paint.

The bath room is equipped with a 3-in. roll rim enameled tub with nickel plated combination modern bath fixtures and 18 x 20 vitreous china lavatory with in-



Suburban Cottage with Open Sleeping Porch—The Living Room Looking Toward the Open Fireplace and Showing Bookcases to the Right and Left

of three-ply oak inside. All doors except the rear entrance have single panels.

Double hung windows are provided with weights supported by Samson spot cord running on $2\frac{1}{4}$ -in. pulleys.

The entire first and second stories are plastered two-coat work with the exception of the ceiling and the wainscot of the dining room. All rooms except the dining room have a hard white finish, while the dining room has a sand finish. The walls of the bath room and kitchen for a height of 5 ft. are plastered with two coats of hard-finish adamant plaster to represent tile. This wainscot is painted two coats, the last being stippled.

The oak floors and birch trim are finished with one coat of shellac and all interior woodwork excepting the maple floors have one coat of Butcher's floor wax. The maple floor has two heavy coats of linseed oil

tegral back and brackets and nickel plated trimmings, also an "Illinois" pattern china water closet.

In the kitchen is a 20 x 30-in. enameled iron sink with integral back and integral right and left-hand drain boards supported on wall hanger and two bronzed iron legs, the sink being 37 in. in height from the floor. In the basement is a two-part cement laundry tray without back and fitted with four Fuller pattern laundry tray cocks, plug, chain, etc. There is also a 30-gallon galvanized iron hot water boiler located in the basement and connecting with all fixtures except the closet.

The house is heated by hot water system, the installation embracing a No. 140 "Spence" heater made by the Pierce, Butler & Pierce Mfg. Company, Syracuse, N. Y. The heater is connected with the smoke flue by No. 20 gauge galvanized iron smoke pipe. The expansion tank is of 32-gallon capacity and is provided

with a $\frac{1}{2}$ -in. vent and 1-in. over-flow pipe. All mains in the basement fall not less than 1 in. in every 10 ft. from the highest point of the heater to the extreme ends of the mains, where they are connected to the return opening of the heater. All pipes and connections in the basement are supported by cast-iron hangers placed 10 ft. apart. All risers on outside walls are covered with asbestos sectional covering.

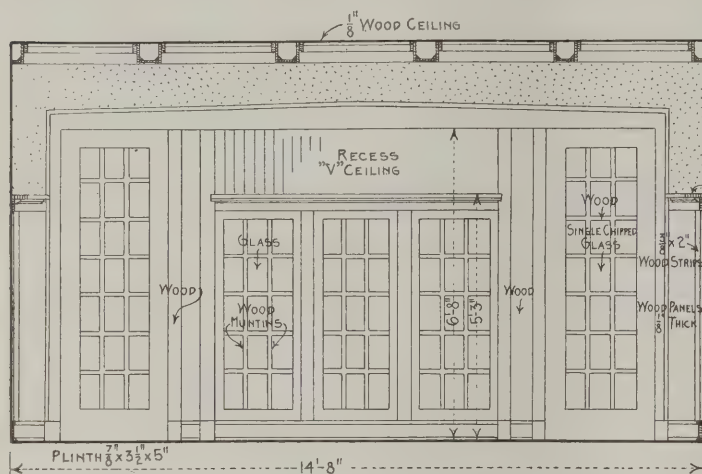
All exposed pipes and heater in the basement are painted in black Japan, while exposed pipes and radiators above basement are finished in bronze of proper colors.

The building is wired for electric lighting and piped for gas. All distributing wires are installed on the two-wire system and no distributing wire carries more than ten lights nor is smaller than 14 B. & S. gauge. All wiring is run in concealed "Galvduct" conduit not less than $\frac{3}{8}$ in. inside diameter. Stamped steel boxes are provided at outlets and wall switches. There

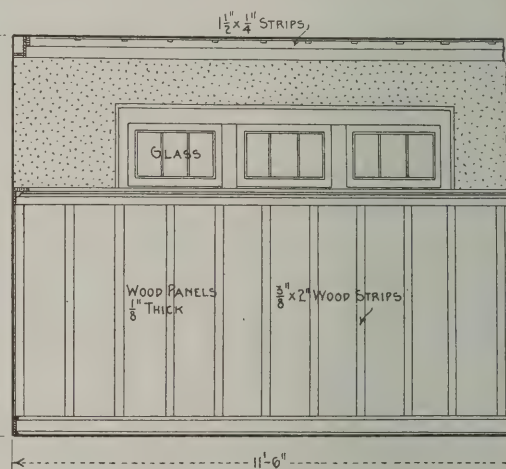
The Open Fireplace in the Home

One landlord in New York at least has solved the problem of keeping a house full of tenants, for not only does he never have a vacancy, but on the other hand he always has a long waiting list of artist and lay folk who appreciate that rare thing in city apartments, a fireplace, says the *New York Sun*. In every one of the spacious living rooms of the apartment, big and little, is a big practical fireplace. Not one of those sham affairs that beguile the unwary flat dweller into the prospect of enjoying an open fire on her own hearthstone, only to find she has succeeded in calling out the fire department, the actual experience of one New York woman, but a fireplace of bricks and mortar with flues that draw beautifully, one large enough to burn good-sized logs in and before which one can sit and build air castles.

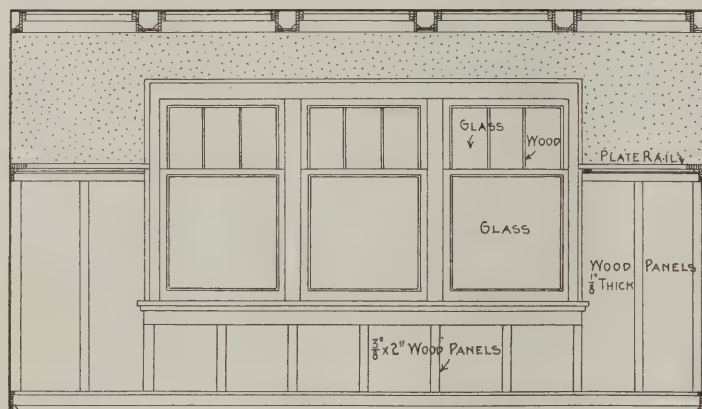
It is safe to say there isn't a real estate firm in town



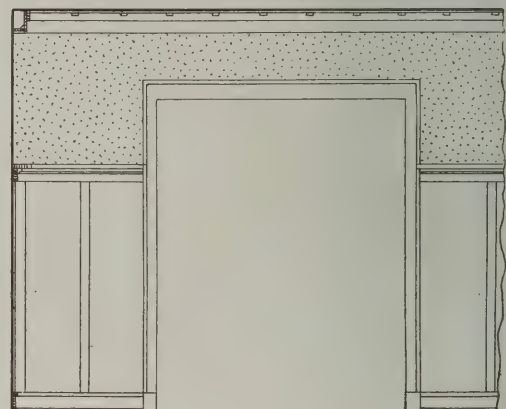
Detail of China Case Side of the Dining Room



Elevation in Dining Room Looking West



Elevation in Dining Room Looking Toward the Street



Elevation in Dining Room Looking Toward the Hall

Miscellaneous Constructive Details of a Suburban Cottage with Open Sleeping Porch

is one main cut-out and switch near the point where the service enters the building. A double pole switch of knife pattern is used at the main connection and "Hart" push button switches elsewhere. Three-way switches are placed in the first floor hall and second floor hall so that lights in either or both halls can be controlled from either one at pleasure. The finish caps of the switches match the hardware in each room. There is a push button at the front door, which operates a bell in the kitchen.

The cottage here illustrated and described was erected for Miss Irene Griess and is located at the northwest corner of Chicago and Fair Oakes Avenue, Oak Park, Ill.

It was built in accordance with plans prepared by Architect Perry W. Swern, 417 South Grove Avenue, Oak Park, Ill., who places the cost at \$4,500.

that hasn't been bombarded with the query, "Where can I get an apartment with a fireplace?" by those to whom an open fire means more than daily bread, and to every one of these fire worshipping hearts there has been flung back the reply, "Not to be had—unless" the callous clerk with the indifference of the purely commercial soul may add, "you want to pay \$4,000 or \$5,000 for the privilege."

This is the situation that has confronted not one but hundreds of homeseekers in New York, and not until three intrepid men, a promoter, an architect and builder of sense and sensibility, got together and decided to demonstrate the problem that a building with chimney stacks for real fireplaces could be put up and the apartments rented at a reasonable figure, has there been any way out of the difficulty. But the success of the venture has had the effect of opening the eyes of spec-

ulative builders and the influence of the house is being felt in many new apartments now under way.

The building covers a plot 90 x 100 ft., is six stories high and contains thirty-five apartments. It is built of North River brick, and is most attractive in design.

Undoubtedly it is the design of the house as well as the floor plan of the apartments that has attracted much attention to the building, as well as the addition of fireplaces. There are several unique features in the size and arrangement of the rooms which commend themselves to home dwellers. One of these is the living-room, which is 13 x 28 ft. in size, at one end of which is the fireplace. Then the long, narrow hall, so ugly and inconvenient, is abolished, and entrance is had into a square hall, to the right and left of which small private halls run. Straight ahead is the living-

Laying a Glass Roof

A contractor who has had some trouble in laying a glass roof or skylight so that it will be perfectly waterproof wrote to *The Painters' Magazine* for information on the subject. He stated that he laid one on a conservatory by lapping the glass and using ordinary putty in laying, but it leaks to such an extent as to render it of little use. In replying to the query the journal in question says:

The glass roof or skylights that consist of extra heavy glass laid in galvanized iron or steel frames and of which many are sent from here to the West Indies and South America, where they are subject to extreme heat and again to long-continued rainy weather, are not laid in ordinary glazier's putty, but



Suburban Cottage with Open Sleeping Porch—Interior View of Dining Room Showing Built-In Buffet, Paneled Wainscoting and Beam Ceiling

room. Opening onto the small halls are the other rooms. There are exits from the living-room to the right into the hall and to the left into the dining room; but all of the rooms can be approached without passing through another room to get to it.

A rather large building for a small lot is the eleven-story apartment hotel to be erected in Eighty-second street, just west of Columbus avenue, New York City, at a cost of \$120,000, in accordance with plans prepared by Mann & MacNeille, 70 East Forty-fifth street, New York City. The hotel will have a frontage of 40 ft., a depth of 21 ft. on one side and 25.8 ft. on the other. It will have a facade of brick and limestone. The dining room will be on the eleventh floor and the office in a pent house on the roof.

in paste oil paint, and the very best material for this purpose is paint skins, in paste form, that have been run through a paint mill or a putty chaser, or, still better, that have been boiled over a fire in a kettle and softened somewhat by adding linseed oil. This remains elastic and does not crack; on the contrary, has the characteristics of rubber, when made from linseed oil paint skins.

In your case, however, if you simply lap the glass without frames as in the case in skylights, it is necessary to thin the paste somewhat and apply a strip of the semi-paste to the end of each under glass, and finally, when laid and paint has set, the ridge made by the top layers must be touched up with the same material in manner similar to that used when clapboard sides are painted, excepting that the paint must be much stouter.

A CIRCULAR SHAPED BARN WITH CENTRAL SILO

A Floor Plan Arrangement That Is of Unusual Interest to the Builder
Whose Specialty Is Farm Barns—Details of Construction

BY HAROLD V. WALSH

CONCENTRATION of work is the keynote of the barn here shown. Everything is so arranged that the least number of footsteps are required to perform the labor, while the maximum of space under a single roof is obtainable. The silo stands in the middle, with the grain bins on the second floor flanking one side of it. Thus the food is centralized to be distributed to the livestock surrounding it. Gravity carries the grain in chutes to various stations along the stalls, and the hay, which is in the outer part, is dropped into service through larger ones.

During the season of filling the barn the hay can be driven up to both exterior doors at opposite sides and pitched in. A fair load can be driven through the twelve-foot-high door into ample space on the interior driveway to fill from there. This permits of the mow being filled in three places at once.

In filling the silo the loads can be driven to the base of it. After unloading the team can be driven on through the barn and out, permitting waiting loads to drive up into position.

Lockers for farm implements, tools and other smaller articles are arranged about this silo on the ground floor. This concentrates the working aids in one space and does

away with the useless walking back and forth to get the particular instruments needed at the time. Moreover, near these lockers and convenient to the driveway is a space for repairing machinery and other farm devices.

Space is also left for vehicles and farm machinery at both sides of one entrance. If more of this is needed it is only a question of doing away with more stalls. But the driveway in the center can be easily utilized for this purpose, especially where the shelter is needed only for the night.

Although this barn is only 68 ft. from wall to wall, there is room outside of the space mentioned above for 17 cow stalls, 4 box stalls, 8 single horse stalls, one open stall with a capacity of holding 50 head of hog or sheep or 25 head of young stock and a smaller stall which can be converted into a hospital or room for nursing calves. The box stalls open directly outside, as well as the large single stall. This permits, in the case of the latter, of the rapid shifting of the loose stock, which is generally housed only over night.

As the floor about these stalls is concrete, drains are constructed to carry off water and empty it outside. This makes a very sanitary flooring, for the shape of

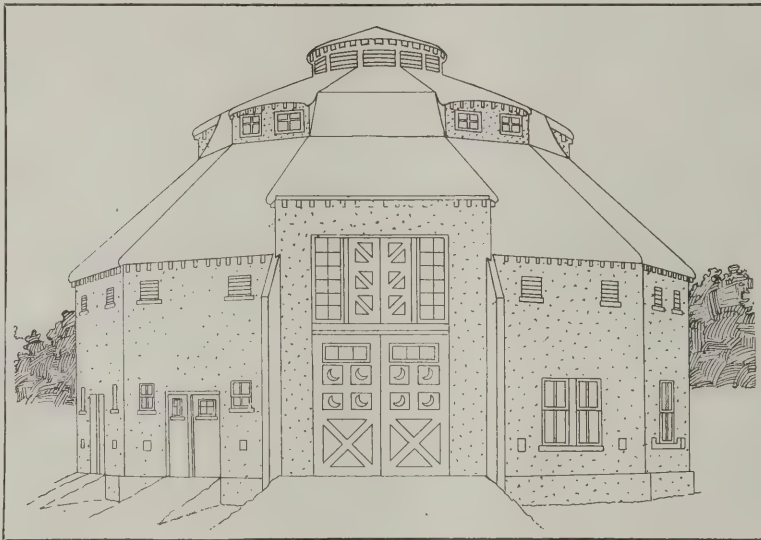
the building permits excellent drainage and allows a thorough slushing with the hose. Litter carriers can be arranged to run along the passageways and by means of switches converge into one track circulating throughout the whole building.

Sanitary precautions are made satisfactory by the ventilation which a building of this shape offers. The fresh air enters through openings on all sides and circulates freely among the livestock. All the foul and hot air rises into the spacious roof and passes out at the circular top. The heat from the hay is allowed to escape in the same manner.

As for the lighting of such a barn, windows open on all sides, and light pours into the center from those in the roof.

With all the advantages of light, air and serviceable-

ness is the adaptability of such a plan to the needs of the individual farmer. The floor spacing is practically one without any structural partitions. He can increase or reduce the number of stalls at will without injuring the essentials of the building. There is space for the installment of any kind of machinery which he may have in mind. The size of the whole structure may be increased or reduced in proportion, ac-



A Circular Shaped Barn with Central Silo—Front View of the Completed Structure

cording to the requirements of the farm on which it is built.

The main framework of the barn consists of 12 posts 6 in. x 8 in. around the silo and 12 intermediate ones 8 in. x 8 in., all 32 ft. long. These are braced radially at the top by 6 in. x 8-in. members and circumferentially by 6 in. x 8-in. plates. They are also braced by the haymow and grain-bin room floors. They are set in concrete bases.

The central posts of the tower are built up with two 2 in. x 4-in. pieces. They are extensions of the twelve main posts and are well braced by diagonal members. The framing of the gable windows is also built of 2-in. x 4-in. pieces upon the top of the main framework. They are all well braced and fastened to the central structure.

The ventilating louvres in the tower are made of fixed slats 6 in. x ½ in., fastened between the twelve posts supporting the roof. They are well overlapped to keep out driving rain or snow.

The outside walls are built of 2 in. x 4-in. studs placed 16 in. on centers and covered with rough boarding, to which is nailed furring strips and to these metal lath is fastened with stucco applied to the latter.

Because of the intermediate posts there are no large spans, so that the rafters are all 2 in. x 6 in. placed 18 in. on centers. At the corners they are doubled.

The shingles are laid 5 in. to the weather and held in place by cut shingle nails, oxidized.

A ledger board running around the exterior wall and intermediate posts holds the 2-in. x 8-in. joists for

runs along the edge of the manger through the cow beds. It has a slanting edge.

At the back of the cow bed is a gutter 1 ft. 8 in. wide. It is 10 in. lower in level than the cow bed and has an outward pitch of $\frac{3}{4}$ in. This leaves a passageway at the back of the cows and around the outer part of the barn about 2 ft. 6 in. wide. The level of this is 4 in. above the level of the bottom of the gutter.

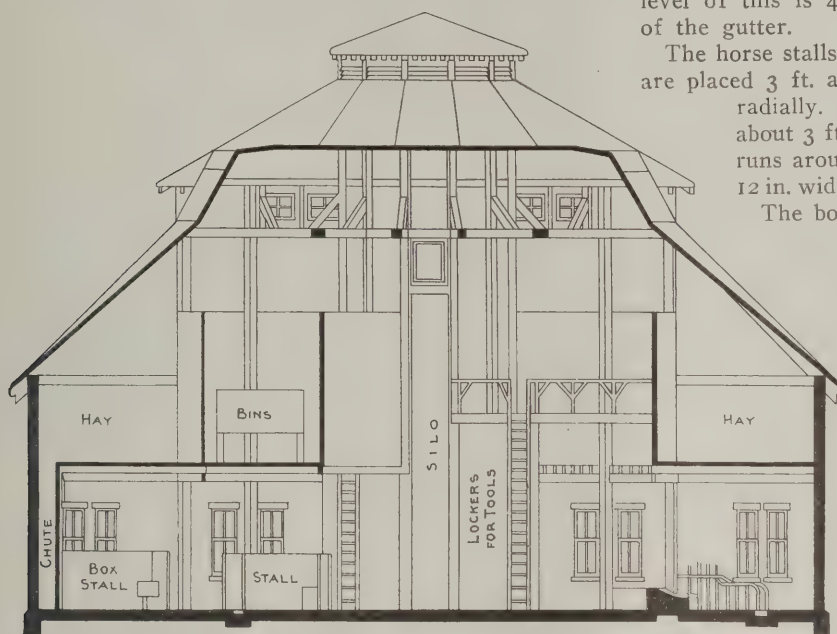
The horse stalls have light wooden partitions. They are placed 3 ft. apart on the inner circle and spread radially. A feed box 1 ft. 6 in. wide and about 3 ft. high and 1 ft. deep, made of wood, runs around the heads of the stalls. A gutter 12 in. wide and 4 in. deep circles the outer ends.

The box stalls also have light wooden partitions with cement floors. They have a slight slope outward.

For the large single stall a feed trough runs around the inner passageway and a gutter 1 ft. 8 in. wide and 4 in. deep around the outer edge.

All cement floors where the animals walk are finished with a wooden float or brushed lightly with a broom. They should never be troweled with steel or creased, for they become very slippery and the creases fill with manure and stable filth.

The interior finish of all parts



Vertical Section with a Portion of the Outside Frame Work Broken Away Showing Internal Arrangement

the hay mow floor. On one side, opposite the driveway, the floor spans over to the silo to give room for grain bins. The flooring is made of matched boards to prevent dust from falling on the animals below.

Hay is held in by rough board partitions, built up three-quarters of the height. This is to allow plenty of air at the top. The ends of the grain-bin rooms are also of rough board.

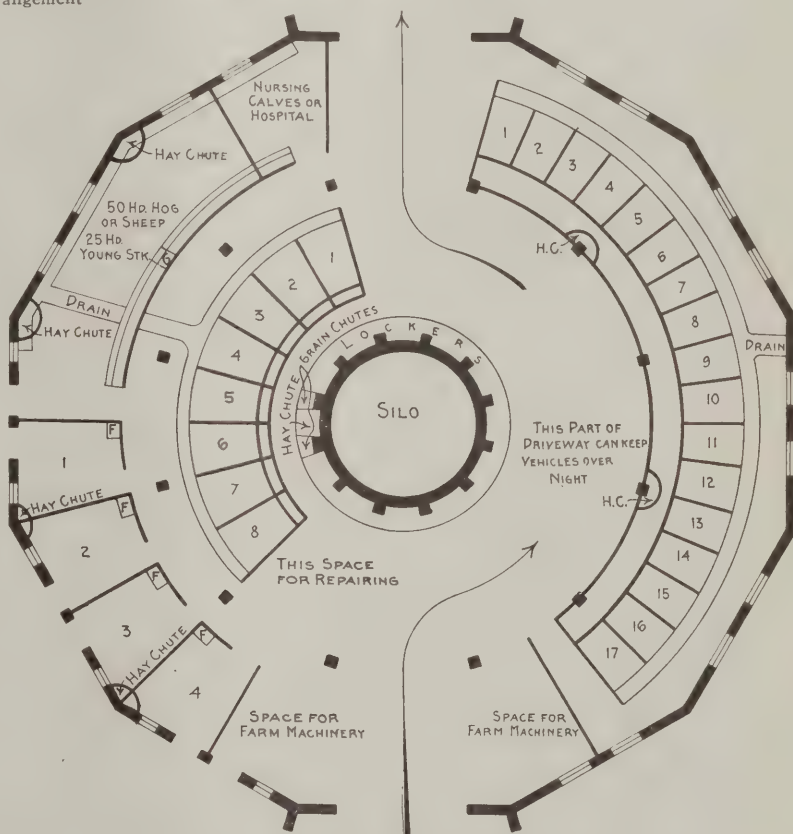
For bracing the framework $\frac{5}{8}$ -in. round iron rods are used, while 30-penny and 20-penny spikes are used for the heavier framing. For the lighter work 8-penny clinch nails are used.

All windows are of the four-light barn sash type, and ventilators are placed near the first floor windows. There are 1-ft. intakes built in the wall through which the air enters from the outside, and passes up over the heads of the animals before it can come out of the box tube. Being colder and heavier it settles down, but without any draught.

The floors throughout the barn are of concrete set on a good bed of cinders.

The cow stalls are made of concrete with metal rail partitions. The manger, which circles around the driveway, is 20 in. above its level. It is a cement trough or circular groove 10 in. or 12 in. deep with the edge furthest from the driveway 8 in. lower than the other. The width is 2 ft. 8 in.

The cow bed is 5 ft. deep and can be made of cement or cork brick. The metal rail partitions are placed 3 ft. apart on the inner circle and spread radially. A groove 1 ft. 8 in. wide and 1 in. deep



Main Floor Plan Showing Stalls, Chutes, Driveway, Etc.

A Circular Shaped Barn with Central Silo—Sectional Elevation and Plan

where the animals are housed should be whitewashed.

Feed distribution is built up according to the needs of the individual farmer. Hay chutes are made of common stock with narrow strips at the bottom put 2 in. apart, so that dust and seed may sift through to the floor. Grain chutes are 1 ft. square and built of wood. They are run from the grain room to various stations along the stalls.

The silo in the center is built of staves of short leaf yellow pine and bound with metal hoops. It has air tight doors up one side and as the silo is filled they are closed one after the other until the top is reached. By the use of the gallery on the side, pitching can be carried on easier at the top. If the farmer has an automatic feed grinder which pumps the ensilage to the top through a flexible pipe, only one door at the top is necessary.

The height of the silo should never be less than 15 ft. To gain the required storage space and compression of corn, silos are made from 25 ft. to 50 ft. in height, but for this barn a 25 ft. silo is very good.

There is no bulge in the center but a uniform cross section the entire length of the silo. This requires adjustable hoops or bands to keep the right tension at all times. When empty the staves dry and require the tightening of the bands. When full the staves become saturated and swollen and require loosening.

Care should be taken that the staves be well painted to prevent loss of moisture, for this is fatal to the fermentation of the ensilage. If the staves are porous and without paint, enough moisture will evaporate to "mummify" a ring of material within, a foot or more in thickness, all around the wall of the silo.

The stability of the silo is insured by the fact that it is built inside of the central posts of the main structure of the barn. The danger of a severe frost is also removed by having the building protecting it on all sides.

There are three important things to figure in building this silo:

1. It must be air tight.
2. It must be strong enough to withstand the bursting pressure from within.
3. It must be of uniform cross section and well painted.

The barn here shown has an exterior of white stucco and roof so treated as to give it a thatched appearance.

Warning to *Building Age* Subscribers and to All Firms Interested in the Building Trades

The management of *Building Age* cautions you to pay no money to a man signing his name "O'Sullivan," and claiming to be a representative of this paper, as he has no authority to transact any business for *Building Age* and is not personally known to this company.

Building Age subscribers are requested to caution their friends against this man and against all other "professional solicitors." "O'Sullivan" has obtained money from a great many people in the building field under the above mentioned misrepresentation, but it is impossible for us to learn of these instances until after he has succeeded in securing money under the pretense of sending a subscription to *Building Age*.

Any information sent to the New York Office or to one of our Branch Offices that will lead to the arrest and conviction of "O'Sullivan" will be appreciated and rewarded, and possibly will assist in a small way in ridding the field of these "professional solicitors" and consequently result in protecting both the subscriber and the publisher.

Protection of Floor Openings

When so-called fireproof buildings which are now being designated as "fire-resisting" or "fire-resistive" buildings were erected the architects and general public felt that the so-called fireproof construction was such a step in advance and such a great improvement over the old wooden beam construction that little or no thought was given to the protection of floor openings. As fire-resisting buildings grew larger in area and

taller in height with the consequent increased amount of valuable contents, says Julius Franke in "Insurance Engineering," attention began to be directed toward the spread of fire from one part of a building to the other.

Fully twenty years ago this principle was admitted by architects, and loft buildings in the City of New York were built with enclosed fireproof stairs, and elevator with solid doors. Sometimes these doors were of wood for the staircases and open grille work for the elevators.

Shortly thereafter the doors for the stairs and elevators began to be made fireproof, and the vent shaft openings that pierce these also had fireproof windows and wireglass provided, and at the present time for tall buildings, with a view of preventing the spread of fire from one part of the building to another, it is not only important to protect all openings, either horizontal or vertical, that communicate with parts above or adjoining, but also to construct the exterior windows with metal and wire glass so that the fire will not communicate from one floor to the other by the outside of the buildings.

Our Cover Design for November

The embellishment of the front cover of the November issue of *The Building Age* will consist of one of the most unique designs yet produced by Architect Fellner. It is a six-room country house with long sweeps of a well broken roof extending well down the first story. The main walls are of hollow tile, stucco finish, and the roof is covered with shingle tile.

The main floor has commodious hall, living room, dining room, kitchen and well equipped pantry, while on the second floor are three sleeping rooms and a well arranged bath room. The interior finish is in keeping with a house of this character and the design is one which we feel sure will strongly appeal to many of our readers.

Glass-Faced Bricks

Glass-faced bricks with concrete backings have appeared on the market. They are said to be equal to any form of tile or glazed brick as a lining for tunnels, swimming pools or bath-rooms; as well as for the inside walls of garages, engine houses, prisons, meat-markets and other structures where perfect cleanliness is as desirable as it is difficult. They are heat and cold resisting, and are declared to be everlasting, requiring no paint or other treatment to preserve their appearance. For shops and factories the concrete-backed glass brick would seem almost an ideal material. The construction of the brick is as follows:

To a glass facing $\frac{1}{4}$ -inch thick at its thinnest part is attached a well proportioned concrete back. The concrete backing is attached to the glass front by three separate means, each entirely sufficient to secure the union of the two materials. First, the cement on the concrete adheres to the glass; second, both ends of the glass face are returned by greater than a right angle, thus imprisoning the concrete mass; third, a dove-tailed rib of glass traverses the entire length of the back of the facing, at once strengthening the glass face and also securing it to the concrete body. The glass face is $\frac{1}{16}$ of an inch larger all around than the concrete body, thus making possible a good mortar bond, notwithstanding that the mortar between the faces of the glass may be almost entirely pressed out. The new bricks are laid in exactly the same manner as other finished bricks.

The most gigantic timber tree in tropical America is the *mora* of British Guiana.

SPECIFICATIONS FOR EXTERIOR PLASTERING

Suggestions for Doing the Work Indicated Which Are of Special Interest and Value to the Progressive Architect and Builder

A LITTLE more than a year ago we published in these columns specifications for stucco on metal lath, since which time they have been the subject of much thought and discussion on the part of those most deeply interested. It is a generally conceded fact that architects and builders as a class are more or less partial to exterior plastering as the outside finish for a house and perhaps with a good reason, but this type of construction has been somewhat retarded in its growth because of failures that were obviously



due to improper methods of executing the work. With a view therefore to placing the matter before the trade in a light which will render all points readily comprehensible the Associated Metal Lath Manufacturers have just issued "Standard Specifications for Exterior Plastering," which we take pleasure in presenting herewith. These represent the "last word," so to speak, on the subject and are a careful amplification of those published last year. Special points of interest are the provisions which cover both types of stucco wall; that is with sheathing and also without it, while another important point is the mixture. The specifications read:

Materials

Cement.—The cement shall meet the requirements of the Standard Specifications for Portland Cement of the American Society for Testing Materials.

Fine Aggregate shall consist of sand, crushed stone,

land cement or the elements shall be permitted in the mixture.

Water shall be clean, free from oil, acid, strong alkalis or vegetable matter.

Preparation of Mortar

Mixing.—The ingredients of the mortar shall be thoroughly mixed to a uniform color, sufficient water added to obtain the desired consistency, and the mixing shall continue until the cement and lime are uniformly distributed and the mass is uniform in color and homogeneous.

The hair or fiber shall be added during the process of wet mixing.

Measuring Proportions.—Methods of measurement of the proportions of the various ingredients, including the water, shall be used which will secure separate uniform measurements at all times. All proportions stated are by volume. A barrel of cement shall be assumed to contain 3.8 cu. ft. Lime when used shall be measured in the form of putty. Hydrated lime shall

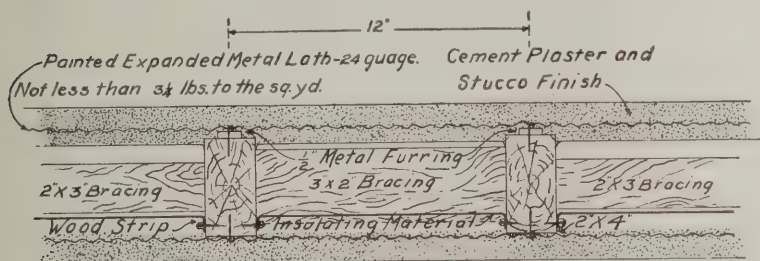


Fig. 1—Detail Showing Section of Exterior Wall—Type A

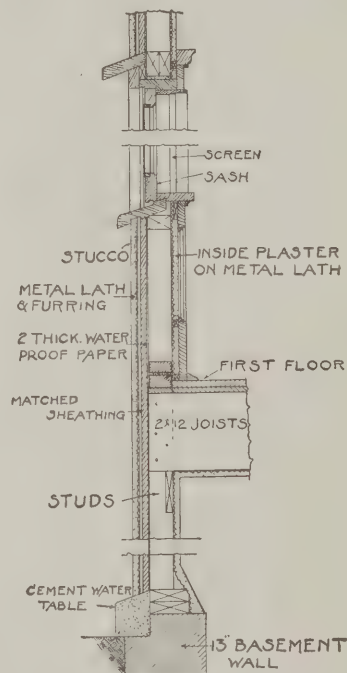


Fig. 2—Section of Stucco Wall—Type B

Specifications for Exterior Plastering—Various Details of Wall Construction

or gravel screenings, graded from fine to coarse, passing when dry a screen having $\frac{1}{8}$ in. diameter holes, shall be preferably of silicious materials, clean, coarse, free from loam, vegetable or other deleterious matter.

Lime.—The lime shall be thoroughly hydrated either by the manufacturer or the contractor. If hydrated by the contractor, it shall be slaked in sufficient water to make a soft paste and allowed to stand at least one week before being applied to the wall.

Hair or Fibre.—There shall be used only first quality long cow hair, free from foreign matter, or a long coconut fibre well combed out.

Coloring Matter.—Only mineral colors shall be used, but no coloring matter which is affected by lime, Port-

Paragraphs marked "a" apply only to back-plastered walls without sheathing. Paragraphs marked "b" apply only to walls with sheathing. All other paragraphs apply to both forms of construction.

be made into putty before being measured. A cubic foot of lime putty contains .31 cu. ft. of hydrated lime weighing 45 lb. and .69 cu. ft. of water weighs 43 lb.

Quantity.—There shall not be mixed at one time more mortar than will be used within one hour. Mortar which has begun to stiffen or take on its initial set shall not be used.

Hand Mixing.—The mixing shall be done on a water-tight platform and the materials shall be turned until they are homogeneous in appearance and color.

Consistency.—The materials shall be mixed so as to provide sufficient water to insure a proper bonding and a dense mortar free from voids.

Retempering.—Retempering mortar, i.e. remixing with water after it has partially set, shall not be allowed.

Framing.—Studs spaced at 12 in. centers wherever

possible shall be run from foundation to rafters without any intervening horizontal grain in the wood. These studs shall be tied together just below the floor joists by 6 in. boards which will be let into the studs on their inner side, so as to be flush and securely nailed to them. These boards will also act as sills for the floor joists, which in addition will be securely spiked to the side of the studs.

Bracing.—The frame of the building shall be so rigidly constructed and braced as to avoid cracking the stucco (a) at least one point between each two floors, brace between the studding with 2 x 3 in. bridging.

(b) Bracing may be omitted, as the sheathing boards act as bracing.

Sheathing.—(a) The lath is to be fastened direct to the studding and back-plastered and no sheathing boards are to be used.

(b) Sheathing boards shall be not less than 6 in. or more than 8 in. wide, dressed on one or both sides to a uniform thickness of $\frac{7}{8}$ in. They shall be laid diagonally across the wall studs and fastened with two nails at each stud.

Inside Waterproofing.—(a) The faces of the stud and for one inch back of the face on each side where the plaster may come in contact with them, shall be thoroughly waterproofed with tar or asphalt.

(b) Over the sheathing boards shall be laid in horizontal layers, beginning at the bottom, a substantial paper wall impregnated and thoroughly waterproofed with tar or asphalt. The bottom strip shall lap over the baseboard at the bottom of the wall, and each strip shall lap the one below at least 2 in. The paper shall lap the flashings at all openings. When required, the lower horizontal edge of each strip shall be cemented with hot or liquid tar or asphalt compound, to the strip below and to the grounds of flashings at all openings. All tacking shall be within 2 in. of the top horizontal edge, where tacks will be covered by the lap of the strip above.

Furring.—When furring strips form an integral part of the metal lath to be used, then separate furring strips as described in this paragraph are to be omitted.

(a) Galvanized or painted $\frac{1}{2}$ in. crimped furring strips not lighter than 22 gauge or other shape giving equal results shall be fastened direct to the studding, using $1\frac{1}{4}$ in. x 14 gauge staples, placed 12 in. apart.

(b) Fasten $\frac{1}{2}$ in. galvanized crimped furring not lighter than 22 gauge or other shape giving equal results over the sheathing paper and directly along the line of the studs, using $1\frac{1}{4}$ in. x 14 gauge galvanized staples, placed 12 in. apart. The same depth of furring should be adhered to around curved surfaces and furring strips shall be placed not less than $1\frac{1}{2}$ in. or more than 4 in. on each side of and above and below all openings.

Preparation of Original Surface.—All roof gutters shall be fixed and down-spout hangers and all other fixed supports and fasteners shall be put up before the plastering is done, so there will be no break made in the plastering where they are permanently fixed.

Wall copings, balustrade rails, chimney caps, cornices, etc., shall be built of concrete, stone, tile or metal with ample overhang drip grooves or lip, and water-tight joints, to keep water from behind the plaster.

If wood sills are used, they should project well from the face of the plaster and have ample drip groove or lip.

Metal lath shall be stopped far enough above the level of the ground to be free from ground moisture.

Care should be taken to provide for placing all trim the proper distance from the studding or furring to show its right projection after the plaster is on.

Lath.—The lath shall be not thinner than 24 gauge, galvanized or painted, expanded metal lath weighing

not less than $3\frac{1}{4}$ lbs. to the square yard of surface.

Application of Lath.—Place lath horizontally over the furring strips driving $1\frac{1}{4}$ in. x 14 gauge galvanized staples 8 in. apart over the furring strips into the studding. The sheets of lath shall be locked or lapped at least 1 in. and tied at joints between studs both vertically and horizontally with 18 gauge wire.

Corners.—There shall be 6 in. strips of metal lath bent around the corners and stapled over the lath, or the sheets of metal lath shall be folded around the corners a distance of at least 3 in. and stapled down, as applied. Galvanized corner bead may be applied over the lath.

Insulation.—(a) After the lath on the outside has been back-plastered, the air space may be divided by applying heavy building paper, quilting, felt or other suitable insulating material between the studs, fastening it to the studs by nailing wood strips over folded ends of the material. This insulation should be so fastened as to clear the bridging, leaving the preponderance of the air space next to the plaster. Care must be taken to keep the insulating material clear of the outside plaster and to make tight joints against the wood framing at the top and bottom of the spaces and against the bridging where the face intercepts.

(b) When quilting, felt, or other insulating material is to be used it shall be applied to the sheathing boards under the inside waterproofing.

Mortar Coats

Plaster.—(a) The first coat shall contain not more than two and one-half ($2\frac{1}{2}$) parts of sand to one (1) part of Portland cement by volume. If lime putty is added, it shall not be in excess of one-third ($\frac{1}{3}$) of the volume of cement. Hair or fibre may be added in sufficient quantity to bond the mortar.

(b) The first coat shall contain not more than two and one-half ($2\frac{1}{2}$) parts of sand to one (1) part of Portland cement by volume. If lime putty is added it shall not be in excess of one-third ($\frac{1}{3}$) of the volume of cement. No hair, fibre or similar material of any kind or in any quantity shall be added to the mortar.

For second coat, the proportion of sand to cement shall not be greater than $2\frac{1}{2}$ to 1 by volume, nor shall more than $\frac{1}{3}$ part of lime putty be added.

For third coat, the proportion of sand to cement shall not be less than 2 to 1 nor more than $2\frac{1}{2}$ to 1, by volume, nor shall more than $\frac{1}{3}$ part of lime putty be added.

Waterproofing.—When a special waterproofing is to be added to mortar for stucco work, it shall be added in strict accordance with the specifications of the manufacturer. Lime should be omitted in the coat in which waterproofing may be used.

Application.—The plastering should be carried on continuously in one general direction, without allowing the plaster to dry at the edge. If it is impossible to work the full width of the wall at one time, the joint should be at some natural division of the surface, such as a window or door.

(a) The first coat shall be applied to the outside of the lath and pushed through sufficiently to give a good key. Over the face of the studs the plaster shall be forced well through the lath in order to fill entirely the space between the lath and the stud. The backing coat shall be applied to the back of the lath and shall be thoroughly troweled so that the lath shall be entirely covered. The final coat shall be applied to the face of the first coat.

(b) The first coat shall be applied to the lath and thoroughly pushed through against the inside waterproofing so as to completely imbed the metal of the lath on both sides. Special care shall be taken to fill all voids around furring strips and where lath laps.

Roughing.—Soon after applying and before the initial set has taken place, the surface of the coats which

are to receive succeeding coats shall be roughened with a saw-toothed paddle or other suitable device.

Dampening.—Before applying mortar the surface of the preceding coat shall be thoroughly wetted to prevent absorption of water from the fresh mortar.

Thickness of Coat.—(a) The first coat shall be at least $\frac{3}{8}$ in. thick over the face of the lath and project through behind the lath about $\frac{3}{8}$ in. The backing coat shall increase the thickness behind the lath to not less than $\frac{5}{8}$ in. The final coat shall be not less than $\frac{3}{8}$ in. thick.

(b) The first coat shall have a minimum thickness over the lath at any point of not less than $\frac{1}{4}$ in. The intermediate coat shall have a thickness of not less than $\frac{1}{4}$ in. or more than $\frac{3}{8}$ in. The final coat shall have a thickness of $\frac{1}{4}$ in. when placed over an intermediate coat, or of $\frac{3}{8}$ in. when placed directly on the scratch coat.

Drying Out.—The final coat shall not be permitted to dry out rapidly and adequate precaution shall be taken, either by sprinkling frequently after the mortar

Splatter Dash or Rough Cast.—After the finishing coat has been brought to a smooth, even surface and before attaining final set, it shall be uniformly coated with a mixture of one part cement and two parts of sand thrown forcibly against it to produce a rough surface of uniform texture when viewed from a distance of 20 feet. Special care shall be taken to prevent the rapid drying out of this finish.

Pebble Dash.—After the finishing coat has been brought to a smooth, even surface, and before attaining initial set, clean round pebbles or other material as selected, not smaller than $\frac{1}{4}$ in. or larger than $\frac{3}{4}$ in., previously wetted, shall be thrown forcibly against the mortar so as to embed themselves in the fresh mortar. They shall be distributed uniformly over the surface of the final coat and may be pushed back into the mortar with a clean wood trowel, but no rubbing of the surface shall be done after the pebbles are embedded.

Exposed Aggregates.—The finishing coat shall be composed of an approved, selected coarse sand, marble

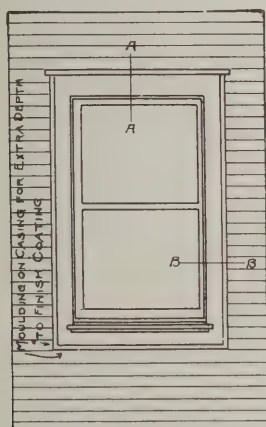


Fig. 3.—Partial elevation of Frame Building to Be "Overcoated"

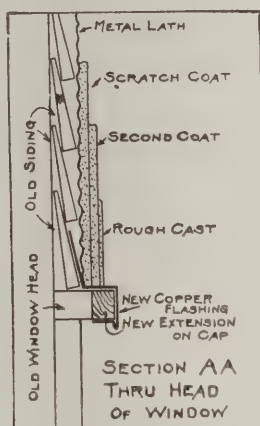


Fig. 4.—Section Through Window Head on Line A-A of Fig. 3

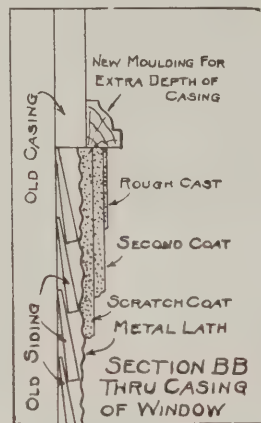


Fig. 5.—Section Through Window Frame on Line B-B of Fig. 3

Specifications for Exterior Plastering—Details for "Overcoating"

has set hard enough to permit it or by hanging wet burlap or other material over the surface.

Freezing.—Stucco should never be applied when the temperature is below freezing.

Finish

Smooth Troweled.—The finishing coat shall be troweled smooth with a metal trowel with as little rubbing as possible.

Stippled.—The finishing coat shall be troweled smooth with a metal trowel with as little rubbing as possible, and then shall be lightly patted with a brush of broom straw to give an even, stippled surface.

Sand Floated.—The finishing coat, after being brought to a smooth, even surface shall be rubbed with a circular motion of a wood float with the addition of a little sand to slightly roughen the surface. This floating shall be done when the mortar has partially set.

Sand Sprayed.—After the finishing coat has been brought to an even surface, it shall be sprayed by means of a wide, long fibre brush—a whisk-broom does very well—dipped into a creamy mixture of equal parts of cement and sand, mixed fresh every 30 minutes and kept well stirred in the bucket by means of the whisk-broom or a paddle. This coating shall be thrown forcibly against the surface to be finished. This treatment shall be applied while the finishing coat is still moist and before it has attained its final set, i. e., within 3 to 5 hours. To obtain lighter shades add hydrated lime of 5 to 15 per cent. of the volume of the cement.

dust, granite dust or other special material, in the proportion given for finishing coats and within 24 hours after being applied and troweled to an even surface, shall be scrubbed with a stiff brush and water. In case the cement is too hard a solution of one part hydrochloric acid in four parts of water by volume can be used in place of water. After the aggregate particles have been uniformly exposed by scrubbing, care shall be taken to remove all traces of the acid by spraying with a hose.

Mortar Colors.—When it is required that any of the above finishes shall be made with colored mortar, not more than 6 per cent. of the weight of Portland cement shall be added to the mortar in the form of finely ground coloring matter.

A predetermined weight of color shall be added dry to each batch of dry fine aggregate before the cement is added. The color and fine aggregate shall be mixed together and then the cement and lime mixed in. The whole shall then be thoroughly mixed dry by shoveling from one pile to another through a $\frac{1}{4}$ in. mesh wire screen until the entire batch is of uniform color. Water shall then be added to bring the mortar to a proper plastering consistency.

Machine Stucco

Stucco may be applied by a machine provided the results obtained are equal to those produced by hand work.

Overcoating

During recent years there has come into vogue a method of remodeling old frame houses. This "over-

coating," as it is called, is used extensively in all sections of the country and the following practice is recommended.

Preparation of Original Surface.—Every house has its own defects and characteristics and each must be treated according to its physical condition.

A tight roof is essential.

Where furring is used so deep that the space back of the lath is not entirely filled with plaster, some provision must be made for extending the old window and door frames to correspond with the increased thickness of the wall. In some cases the plaster is brought over the old frames in such a manner that a recessed window or door opening is made. In case the furring strips are fastened to the studding, it is not necessary to provide for extending the window and door frames, as the new stucco finish will have the same relations as the old weather-boarding.

If the weather-boarding is in poor condition it should be removed and furring strips and metal lath applied over the sheathing, to which waterproof paper has previously been fastened. It may be advisable also to tear off the sheathing, in which case the furring strips can be fastened direct to the studding after bracing between the studs and then finish as type "A" above.

Another method would be to fasten the furring strips to the weather-boards to which the metal lath is applied, after applying waterproof paper over the weather-boarding.

In preparation for any of these methods the house should be gone over carefully to determine if the framework is well enough preserved to justify the improvement.

The doors should be looked after, the studding inspected, partitions and outside walls lined up and brought into plumb.

Furring.—Fasten galvanized $\frac{1}{2}$ in. crimped furring or other shape giving equal results, vertically over the original surface, whichever of the above may be adopted.

Lathing and Plastering.—Follow the above specifications for stucco.

Application of Tile to Concrete Surfaces

The intensely practical advantages of concrete have so impressed themselves upon the public that there is no longer any question as to its use from that point of view. The beauty and treatment of concrete surfaces, because of this utilitarian development, have not received the important study warranted by the nature of the material. A few authorities advocate leaving concrete surfaces just as they are when the rough forms are removed. However meritorious this may be, the majority of architects look upon concrete as a material which from its very nature gives a most extended opportunity in surface decoration and color. Architecture in stone is essentially dependent upon architectural lines—shade and shadow—whereas architecture in brick or concrete is dependent upon the actual treatment of their surfaces for their character and effect.

From this viewpoint, which is that of the majority of architects, any material enriching the surface of a concrete wall without interfering with its structural strength is possible and worthy of consideration, says John Wynkoop in the *Mantel Monthly*. Of stone, brick pigments and tile, the latter is, undoubtedly, best adaptable because of its beauty and extreme simplicity in application. In France, Italy and America the application of tile to concrete surfaces has been considerably exploited, so that many actual examples exist upon which to base an opinion as to the effect produced. From these and from the general principles of

design involved, it may be seen that extreme accuracy of tile setting as we know the material in general use is harmful to fine effects and not to be desired. Concrete, especially for exterior use, should be sufficiently rough and uneven to insure artistic surface modeling when seen from a considerable distance. This necessitates a free and varied treatment of any tile applied to it, both as to setting and as to coloring. The color of the concrete itself in the main determines the color scheme of such tiles as are applied to it. Rough and deeply colored tiles are found to blend most easily with the rough surface of the concrete, although it can easily be imagined how certain bands or spots in tile could be both highly colored and finished to bring out accents sought after by the designer.

Contract an Important Element

Especially in country house work the application of tile must be concentrated largely because of the costliness of entirely covering the concrete. As a matter of effect, from an artist's point of view, what a concrete surface needs is contrast with some material which is more refined and decorative than itself. Panels, band courses or scattered designs in tiles, so long as they do not become all over patterns, seem particularly advisable in this kind of work. As much depends upon concentrating this decoration as does upon an intelligent selection of colors and an artistic placing of the individual tiles. Without doubt there can be no limit to the ways in which tile employed in this way may be treated. Practically any size and shape, any color, any surface are being manufactured continually, and along with this molding and special colors and combinations may be obtained, provided the manufacturer considers the amount to be ordered as warranting him to produce special ideas in this way.

In fact, a rather new and certainly delightful avenue of designs has been opened to the architect by the increasing prominence of concrete and its allied arts and materials. An original and pleasing type of building is to come from concrete, and without question, decorative tiles are to play an important part in this new type of the twentieth century.

A Skyscraper of 1601.

According to press despatches from Paris it has been discovered there that the originator of the American skyscraper or *gratteciel* was not an American architect, but a Frenchman who lived three centuries ago. At the Bibliothèque Nationale there is preserved a volume written by this architect, whose name was Jacques Perret of Chambéry, in 1601, describing a skyscraper of the author's invention.

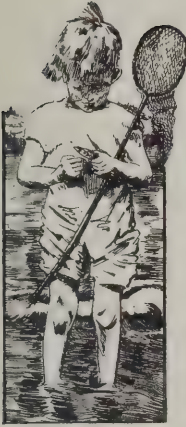
"This grand and excellent pavilion, in which one can lodge 500 persons in comfort and luxury," was to be of 160 ft. frontage, 145 ft. in width and with walls 10 ft. thick. The edifice was to rise 12 stories and have a little pavilion on the roof surrounded by terraces and was thus to reach an altitude of 350 ft., which," says *L'Illustration*, "is of course hardly to be compared with the gigantic buildings of 480 to 700 ft. which Pierre Loti saw on his recent visit to New York City. At the same time Perret's design is certainly the design of the American skyscraper 300 years later—an audacious idea conceived by a Frenchman."

One result of the rapid extension of new Subway lines into the Borough of Brooklyn, N. Y., is seen in the building operations which are being planned in the immediate vicinity of the routes. In one operation 100 dwellings are involved, in another are 68 and in others are several high class apartment houses.

CABINET WORK FOR THE CARPENTER—VI.

Comfort in Reading and Holding Reference Books—Remodeling the Piano Stool—The Piano Bench with Compartment for Sheet Music

BY PAUL D. OTTER



IN a closer inspection do we get well acquainted with that in which we are interested, but how disinclined are we to go after information which most usually is stored up in large volumes; for after nightfall most of us feel too luxuriously indolent to hold up a book of reference, much less take notes therefrom. There is truly some effort in the use of dictionaries and encyclopedias on account of their unusual size and weight, and whatever facilitates frequent inspection of them and a regular habit of reading varied literature, while occupying a

comfortable chair at a restful angle, will, I am sure, impel our craftsmen friends to prepare plans for the making of a reading table after the suggestion shown in Figs. 1 and 2. I am a little inclined to think that the main parts of some of these tables which are sold are built entirely too light, for while they are intended to draw easily toward you and adjust to the distance and angle of one's vision, yet they should have at least the four posts strong enough that they would not break or part company with base or top. Care then should be given to the joinery to make the construction firm, but as light and graceful as consistent, and it may be that some of our readers may desire to put in turned posts instead of those indicated. Mortising the long rails into the posts, and using dowels for securing the end rails into the posts will lock one into the other and also save the strength of the posts.

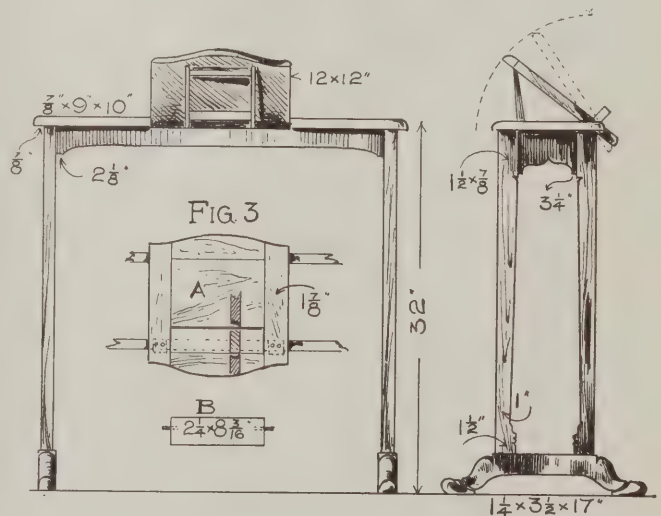
Personal requirements should be considered as to not only the fixed height, but the extreme width inside between posts. Some particularly restful arm chair or rocker would determine this. The width should be sufficient to allow of the table being drawn readily over the arms, which frequently are more than 30 in. over all, in a Morris chair for instance.

It will be seen that the three parts of the table rest upon the framing of the rails to the posts, the two outside portions of the top being securely held thereto by screws counterbored through rails, while glued corner blocks may give the framing greater stiffness.

The center of the table is a frame filled with a larger fixed panel shown at *A* in Fig. 3, and the smaller, shown at *B*, is loose and swivels on steel pins properly located so that it may be swung up at right angles when needed to rest the book upon. The fitting and adjusting of this swing piece is done in connection with fitting up the frame, and when ready to glue up, the steel pins are inserted with a very thin washer between to insure free action. The larger panel is also set in, being fastened permanently with glue, and the entire frame glued together and held in clamps until dry. By the exercise of a little care the swing book support *B* may be so fitted that only a very slight crack will show on the surface of the table; for detail of this see Fig. 3, *A* and *B*. By experimenting you will find that the edges of movable and fixed parts will have to be treated from underneath as indicated in the section shown. After framed-up panel has been fully completed it is fitted in between the two tops, trimming just sufficiently to avoid binding. Then locate and mark

places for two hinges on one side and after these have been fitted to allow all tops to be flush, proceed to arrange for a swinging adjustable support. This is shown in the drawing, but many other ideas may be suggested while you proceed with the work. The scheming and creation of simple devices is a great part in the pleasure in making furniture. It may be that a small drawer or compartment would be desirable. Sufficient to hold pencils and note paper, and the supporting device would have to be such as to not interfere—think it out. That is one of the privileges and the joys of a craftsman, to scheme and create simple devices that add to the utility or aids in the economy of space. Recently the writer dealt with an arm chair designed for the private car of a president of a large railway. His desire was to have a tablet drawer for paper under the seat; and in the roll arm, his mechanic had secreted a brass tube to contain pencils, one tube working within another and controlled by a secret spring. That chair, personally, was gratifying and he always knew where to find his writing material.

The pattern of piano stool frequently on sale, or handled by the piano dealer, bears little resemblance to style or features of the piano you have selected. As the designs of pianos are now under the influence of more restful lines and reposeful surfaces, the form

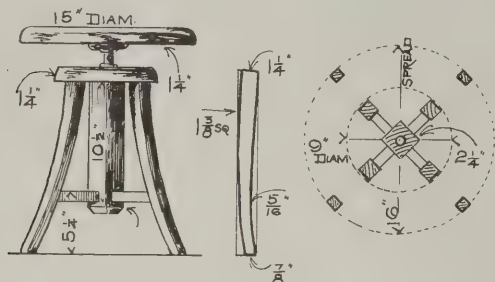


Figs. 1, 2 and 3—Elevations and Details of a Reading Table
Cabinet Work for the Carpenter—VI

of stool with turned legs, cast claw and glass ball fails to harmonize, and with this thought such a stool has been transformed and is illustrated in Fig. 4. Piano stools are not usually made by piano makers and we will assume that the reader possesses the conventional type which the piano salesman has presented to him, for it is generally "thrown in" as a generous gift after the sale of the piano has been closed—one never quarrels with a gift, at the time, but surely most frequently that stool does not match the piano—so withdraw the screw and nut, as you probably will not be able to get one elsewhere; also save the tops and otherwise use the general proportions in constructing a type of stool which will be more in keeping with your particular piano. As in all forms of furniture, the attractiveness is quite entirely in the good workmanship and the final

finish. This simple pattern is offered, but modifications may readily be made in introducing certain cuts or features that stand out as a main feature of the piano case in question. The central square column which is bored out to receive the screw and nut may be treated like a "square turning" in which you can introduce the predominating mold appearing in your piano. In this way you individualize your work and it becomes interesting by just that much of yourself put into it.

In selecting the material for the four square taper legs you may be fortunate in finding a piece of $1\frac{3}{8}$ -in. stock in which the grain happens to run in a slight



Figs. 4, 5 and 6—Details of Piano Stool

curve in line with the paper pattern you have made. Nature is often very accommodating that way if we take a little trouble to find it out, and this feature of cabinet making is the secret of the "old masters," of getting into harmony with their work and material. It is the intuitive bump cultivated so highly which has made their work so prized and enduring. Now, these legs, for instance, may, by a little sorting over or even turning the pattern in a proper way, be made entirely in tune with nature's grain, assuring us that there would be little possibility of one or all of them splitting later on by a badly selected short-grained piece. This is mentioned at some length, for it is the little preliminaries of laying out and beginning which bring about strong and satisfactory furniture. A pattern may be secured from drawing of the dimensions given in Fig. 6. With the pattern cut out of stiff paper, lay it over the selected material of $1\frac{3}{8}$ -in. squares and mark all of them. Then saw them on a band saw, or reduce to a line by draw knife and shave, after which they must again be marked, putting the pattern over the shaped surface and marking with a pencil. A good way to mark a re-shape is to have sufficient thickness of stock in your squares; then mark the pattern on one side; turn it over the back corner and mark again. Saw out and replace with small brads the first refuse piece which contains your marking; then proceed to saw again. You will appreciate this method when dealing with the situation, particularly when proceeding to saw out a claw foot, or leg of various curves or indentations. It is better to preserve the shape of the original square when sawing the second time by tacking on the first waste piece.

The pedestal block is, when finished, $2\frac{1}{2}$ in. square by $10\frac{1}{2}$ in. long, and at the lower end a criss-cross mortise is made to exactly fit down over the 1-in. square criss-cross stretchers which have been previously halved together. A lower finishing cap is then made 1 in. by $2\frac{1}{2}$ in. square with a $\frac{1}{2}$ -in. chamfer mold. This cap is finally glued over the finished surface of pedestal block and the lower face of the cross stretchers, passing a screw through all three parts, and small screws or brads at the corners into the end of the pedestals.

The outer ends of the stretchers have previously been cut to tenons on a slight slant to fit properly into the sloping legs of the stool. Fig. 5 shows the plan of the stool in relation to contact of legs at the floor and as they enter the round cap block over the square pedestal.

In a developing family, the piano bench is to be recommended. There is greater freedom of movement and it is condensed for duet purposes, or for the use of teacher and pupil, while the space under the seat is doing service for sheet music. As Figs. 7 and 8 clearly indicate a simple form of construction, little need be said. Great care should be given the selection of a well dried board for the top, as it is a free panel swinging open on hinges after the manner of a tool chest top. This top, which should have a final thickness of $\frac{7}{8}$ of an inch, might represent some skilled joinery in the nature of a frame and an inserted flush middle panel, or if a solid panel be used it would be wiser to sink in two narrow cross battens and meet them lengthwise with battens glued to the surface, thus forming a slightly raised framing which would be within the outer frame of the bench when the top was down.

The bottom board of the music compartment, which is 2 in. in depth, should also be well selected to avoid splitting, and cut sufficiently large to have the under edge all around relished down to $\frac{1}{4}$ in. to fit into a corresponding groove provided on the inside of the rails before the entire construction is finally brought together and glued up. Glue corner blocks fitted and cut away to avoid being seen, and set against the posts under the bottom of the compartment, will also aid greatly.

Origin of Colonial Architecture

Frank Miles Day, the architect, desired to illustrate at the T-Square Club in Philadelphia a piece of architectural ignorance.

"Why," he said, "it was as bad as the woman who

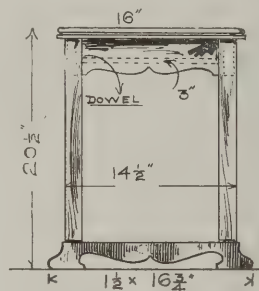


Fig. 7—End Elevation of Piano Bench

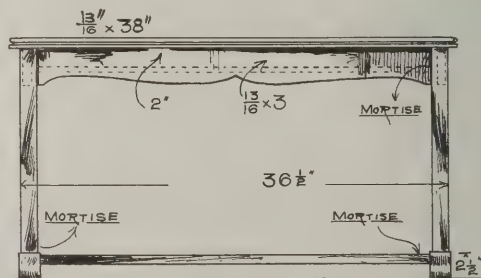


Fig. 8—Front Elevation of Piano Bench

Cabinet Work for the Carpenter—VI

listened to a lecture on Cologne cathedral and at the end shook the lecturer's hand and said:

"Oh, thank you, sir, for your illuminating remarks. I often wondered where our colonial architecture came from. Now, of course, I see that it comes from Cologne."—*Los Angeles Times*.

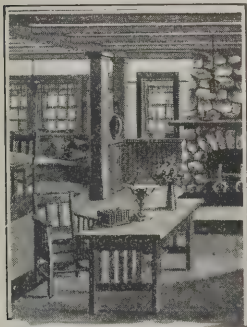
According to the Chief Secretary for Ireland there is now in process of erection in that country 3439 workmen's cottages, the average cost of which is approximately \$850. On March 30 of last year 39,241 cottages of this character had been erected.

INTERIOR DECORATIONS FOR COVER DESIGN

Suggested Color Schemes for the Various Rooms with Hints Regarding Furniture, Floor Covering and Wall Treatment

BY ANNA L. MOFFATT

IN planning the interior decorations for the house constituting the subject of the cover design of this issue of the paper, I would suggest a simple direct treatment. The arrangement of the first floor shows



some distinctive features, notably the staircase so often a problem in planning the comparatively small house. In the living room which is Mission showing Flemish influence, the wood work is cypress which is given a Flemish stain. I would cover the lower wall space here with a gray brown burlap having small stencil design in blue and brown. To the upper

third I would give a flat finish in a soft tan.

A domestic rug showing tan, brown and blue with blue predominating will be most harmonious. This rug comes in soft colors well blended and sells for \$50.00 in 9 x 12 size. A small rug having the same coloring may be laid at each end of the room.

At the windows there may be casement curtains in ecru scrim. These should be hemstitched and have a small stencil border same design as shown in the wall covering. The table runner may also be of this material and design.

The fireplace of brown gruebe tile would be appropriate to the design. The settle seats would look well, cushioned in gray brown velour. I would have touches of blue throughout the room, a vase in old blue, perhaps a piece of tapestry hanging from the end of the piano to break the line.

A vase lamp with teronea shade showing Autumn colorings will help the scheme wonderfully and with a few good pictures well hung the effect will be one of individuality and the individual note is always an effect well worth while.

The Dining Room

The dining room, opening as it does directly from the living room, must obviously have a color scheme that will harmonize perfectly. A notable feature here is the built-in buffet and seat. Often an effect is obtained from these built-in pieces that is unattainable with movable furniture. We have given the wood work here an antique finish and would suggest old blue wall covering, a rug in soft tones of blue would be excellent. At the windows there may be ecru curtains same as living room, omitting the stencil design. I would have over draperies of old blue silk, these should be made with valance across the top with silk hanging from each side of double window. At the large opening to living room I would hang draperies of old blue velour. The furniture will be of antique oak. This is sure to be a handsome dining room and the vista from living room will be charming.

The Second Floor

The architect has arranged the second floor with a view to convenience and economy. Here there is not an inch of space that is not utilized to good advantage. The wood work of this floor is given a flat white finish. The walls in the upper hall are covered with a light tan ingrains paper same shade as the upper

third of living room and staircase wall. For the first bedroom I would suggest a wall covering of a soft gray paper having a flower border in bright tones. I would have muslin curtains at the windows; these should be draped back. There may be other hangings of cretonne of bright coloring same as wall border. On the floor space I would place several rag rugs. These should be selected showing rose color through the weave. For the furniture here I would have a mahogany bureau, white enameled bed, and small mahogany sewing table. The chairs may be of willow painted gray. These should have cushions of cretonne same as hangings. This will make a bright room and simple with all.

Second Bedroom

For the walls of the second bedroom I would use an old-fashioned paper in a blue and white stripe design. I would cover the floor space with a blue cotton rug. The other hangings here may be of blue cotton rip having narrow grump border in self tone. Maple furniture will be most excellent here.

Third Bedroom

For the bedroom number three I have in mind a paper showing bright tones with light green foliage. The windows here have muslin curtains same as the other rooms on this floor. The other hangings should be of apple green cotton rep having guimp fringe edging in self tones. These should be hung with valance. A rug in two tones of green covering the floor space. I would have white enamel furniture with one or two willow chairs which should be cushioned in green. The effect will be dainty and inviting. Old Colonial furniture would also be most effective here.

Bath Room

The bath room is done entirely in white having tile floor with keen cement walls to the height of 4½ feet. There may be a tan and white rug here and the fixtures are in the practical nickel finish. The whole scheme here suggested shows an attractive, practical and tastefully finished room.

An Unusual House Moving Operation

One of the largest undertakings of the kind ever attempted in the District of Columbia is the moving of 92 buildings consisting of two solid blocks of houses in order to make way for the plaza between the Union Station and the Capitol. The work is being done by Hugh J. Phillips, a local contractor, who has arranged with owners of more than 25 pieces of property to transfer bodily the structures to their vacant holdings. The other structures will be razed and the material utilized in the erection of buildings in other sections. One of the buildings is the historic Washington Inn built by the first president of the United States. It is estimated by Elliott Woods, Superintendent of the Capitol, that the original cost of the improvements on the two blocks exceeded \$1,000,000. We understand that Mr. Phillips pays \$7,300 for the privilege of clearing the property.

GAMBREL ROOFED HOUSE WITH STUCCO EXTERIOR

Compact Design Suitable for a Suburban Residence—A Case in Which Veranda Space Has Been Sacrificed to Insure Abundance of Light

THE stairway tower as a space saver is a feature of the house here illustrated and which forms the subject of our colored cover design this month. The architect has turned the stairway into an asset rather than a liability, for he has provided a little tower from the windows of which one is given a view to front, side and rear as he ascends. Whoever has sat in a wide chimney corner of a winter's evening and "watched the fire burn red and low" will agree that there is full justification for the praise of the ingle nook in song and story; and the architect has taken this bit of romance from the Colonial time and set it in a modern living room, where it immediately justifies itself on the old and sound principle of utility.

The high back of the chimney corner seat furnishes a convenient means of screening the door which gives access to the kitchen directly from the living room.

Another feature is the arrangement of the closet and pantry space between the kitchen and the dining room. The rear entrance can be gained with equal facility from kitchen or dining room, and the swing doors of the pantry prevent the access of drafts to either room.

The dining room is given its own cozy touch by the broad window seat at the side, and is well lighted by the double mullion windows in both outside walls.

The Second Floor

The absence of the troublesome stairway in the rectangular area of the second floor makes possible an arrangement which would otherwise be difficult to attain. Two closets each are provided in the symmetrical front bed rooms, and the architect is equally liberal in the case of the smaller chamber at the rear.

Another closet, with access from the hall, is of sufficient proportions to be dignified with the term "store room," and the presence of additional space is indicated by the stairway which leads to the attic beneath the first slope of the gambrel roof. A small bed room is also located in the attic and the entire space is finished with wall board and painted.

This house is designed to occupy a plot 40 or 50 ft. front by 100 ft. in depth, and this would leave space for the extension of the porch around to the right side of the house, if desired.

The cellar is built under the entire house and contains a furnace room with space for wood and coal. A storeroom is provided which is equipped with shelves and closet. The foundation walls are of concrete 10 in. in thickness and set on footings of concrete 10 in. thick and 22 in. in width.

The interior walls are plastered two coats with a sand finish, except the second floor walls, which have a hard smooth finish. The chimney breast below the mantel shelf is tiled with 6 x 6-in. tile laid up with tapestry brick and the hearth is also tiled with 6 x 6-in. red tile or brick. The chimney is built of brick laid in cement mortar and flues lined with vitrified lining.

The chimney exterior is finished in stucco to match the walls. The latter are finished with two coats of stucco, composed of one part cement, three parts sharp sand, and not more than 10 per cent lime putty. The first coat is 1/2 in. thick, applied under pressure, and well scratched before it sets.

The first floor joists are 2 x 10 in., the second floor joists 2 x 8 in. and the attic floor joists 2 x 8 in., all spaced 16 in. on centers. The rafters are 2 x 6 in.,

spaced 20 in. on centers. The studs are 2 x 4 in., also spaced 16 in. on centers; the plates are 4 x 4 in., the corner posts 4 x 4 in. and the sills 4 x 6 in.

The doors are of pine, veneered, and all trim is of cypress or chestnut; windows, door-frames, and all outside trim are of white pine. The roof is covered with red cedar shingles laid 5 1/2 in. to the weather.

Sheet metal work is painted with two coats of mineral paint on both sides. Outside trim is primed with lead and painted two coats.

Plumbing is of modern design, all exposed pipes nickel-plated, and all fixtures in the bath room porcelain-enameled. Earthenware trays and iron enameled sink are used in the kitchen, and the equipment of the latter includes a gas range and 30-gal. gas hot-water boiler. Combination gas and electric fixtures are installed.

The specifications include the installation of a steam heating plant with guarantee of 70 deg. F. temperature in zero weather.

The cubical contents of the house are as follows:

Size of house, 25 ft. x 35 ft. by approximate height 30 ft. equals 26,250 cu. ft.

26,250 cu. ft. at 22c per cu. ft. equals \$5,775.00.

Cost of Labor and Materials

Following is an approximate estimate of the cost of labor and material.

Excavating and grading	\$195.00
Masonry work, including concrete footings, foundation walls, chimney and fire place.....	500.00
Plastering exterior and interior	700.00
Carpentry work, including lumber bill, mill work, etc....	2800.00
Hardware	125.00
Metal work	150.00
Plumbing and gas fitting	300.00
Heating, if steam	430.00
Electric wiring	85.00
Painting, staining and tinting.....	400.00
Combination lighting fixtures	90.00
	\$5775.00

The above figures include the contractor's 10 per cent profit.

This house was designed by Arthur Weindorf, architect, care of *The Building Age*, or Long Island City, N. Y.

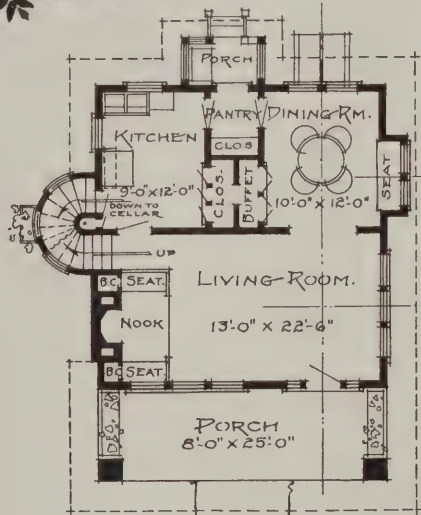
Modern Heating in Norwegian Buildings

Steam and hot water heating are both extensively used in Christiania and they are commencing to be used in Bergen and Drammen. In Christiania, which is a city of apartments or flats, not only have all new buildings erected during the past three years been equipped with one system or the other, but a large number of old apartment houses have been so equipped, because tenants for buildings without this convenience are difficult to secure. In churches, public buildings and schools, says Consul General Charles A. Holder, these systems are also used to some extent, though hot air heating is more common.

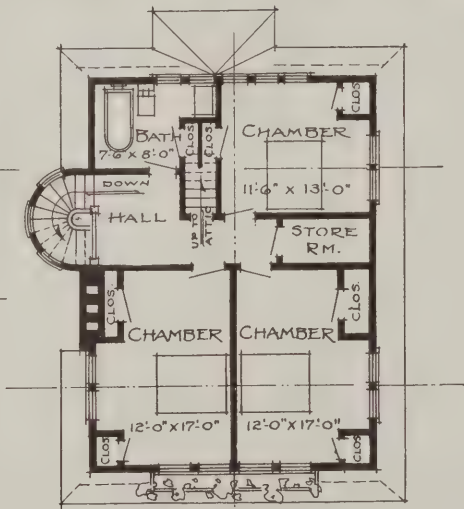
According to the report of the State Superintendent of Insurance the fire loss in United States and Canada during 1912 amounted to approximately \$225,000,000. This was \$9,000,000 less than 1911 and \$2,000,000 less than average for the last five years.



VIEW FROM REAR.

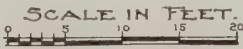


◆ FIRST FLOOR PLAN ◆



◆ SECOND FLOOR PLAN ◆

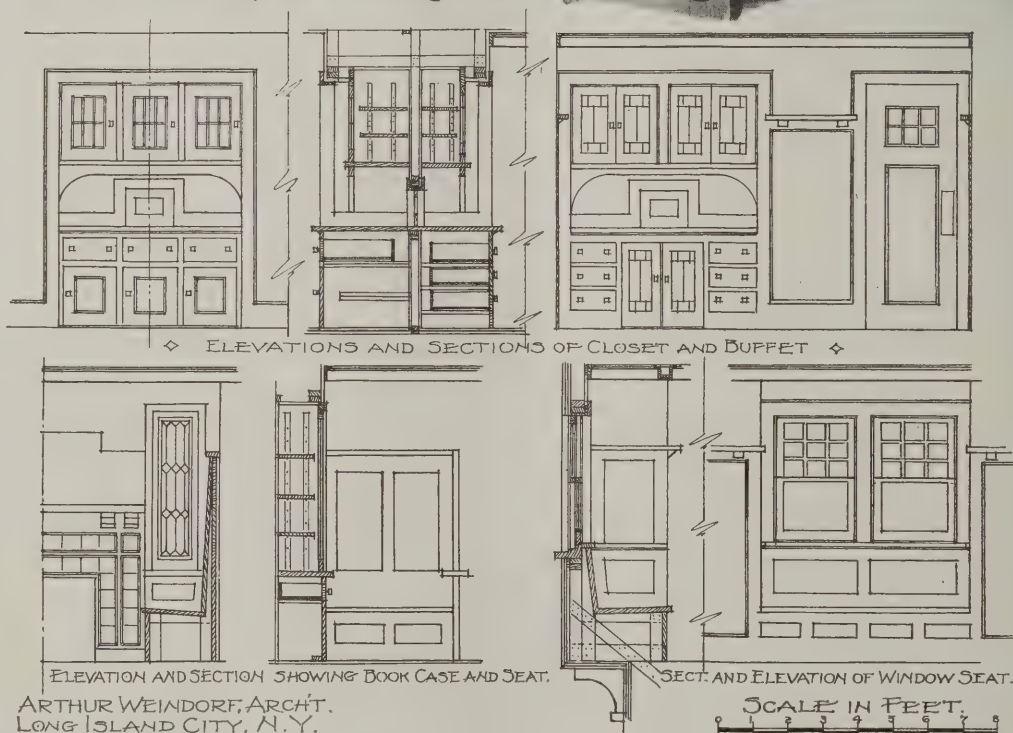
ARTHUR WEINDORF, ARCHT.
1.ONG ISLAND CITY, N.Y.



Perspective View and Floor Plans of House Shown on Front Cover This Month



VIEW IN LIVING ROOM.



ARTHUR WEINDORF, ARCHT.
LONG ISLAND CITY, N.Y.

Interior View and Miscellaneous Details of House Shown on Front Cover

WATERPROOFING CELLAR AND MASONRY WALLS

Some Suggestions Likely to Be Found of Value to the Builder
Especially in Connection with Concrete Construction

By CHARLES E. ANDERSON

THE waterproofing of cellar and other masonry walls exposed to dampness or the action of water is a problem which often confronts the builder, and the best method to use is something which can be decided only after a careful study of all conditions which may arise in connection with a specific case. It is perfectly feasible to have a dry foundation under any structure no matter what the surroundings may be, provided proper attention is given to this important point. Dampness may be caused in a cellar by the water soaking through or being drawn up into the walls by capillary action, or it may be forced up through the bottom by the pressure of the water in the surrounding earth.

It is seldom that a builder is called upon to waterproof against pressure, but when the occasion does arise it is well to know what to do, as in this case special methods are necessary. It must be understood that waterproofing and damp-proofing are distinctly different. Any good concrete wall is waterproof in the

to three parts of clean, well-graded sand, placing it of a consistency that will allow it to flow into place, spading it well while placing, especially along the "forms," the mass will after hardening be waterproof, although it may not be entirely damp-proof. It must be remembered that concrete cannot be placed in running water, nor with water running through it, with any certainty of obtaining a watertight job, or even a solid wall, since the water is sure to wash out some of the cement, leaving voids and cavities which not only allow water to enter the wall, but materially weaken the concrete.

Integral waterproofing is accomplished by means of several waterproofing compounds which are on the market, and some of these are also recommended for damp-proofing. Integral and surface waterproofing are also both accomplished by the "Sylvester Method," in which soap and alum are used to form an insoluble compound, resisting water and filling the voids in the

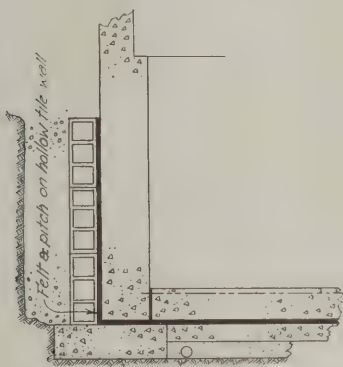


Fig. 1—Methods of Using Felt and Pitch, Avoiding the Difficulty of Applying to the Outside of a Wall

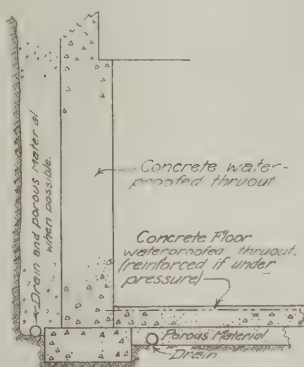


Fig. 2—Waterproofing Concrete by the Integral Method

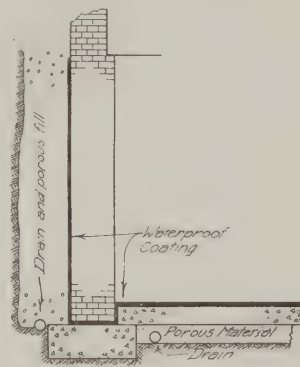


Fig. 3—Method of Waterproofing Masonry Wall with Outside Coating

Waterproofing Cellar and Other Masonry Walls

true sense of the word, provided it has no cracks or holes in it. That is to say, water cannot flow through it. If, with moisture on the outside of the wall, no moisture or dampness appears on the interior or opposite surface the wall is damp-proof.

The methods used in waterproofing and damp-proofing divide themselves primarily into two groups, i. e., "coatings," and "integral." Integral waterproofing consists in incorporating in the mass of the masonry a water-resisting material. Needless to say, the integral method is applicable only to concrete work and in the process of placing. Certain of the coating materials, however, can be applied to any kind of masonry provided the condition of the wall is such that it will take a coating.

It has been proved that waterproofing, as above defined, can be accomplished by using a sufficiently rich mixture in concrete and placing it in a manner calculated to give the maximum density to the mass. The effect is modified to some extent by the use of well graded or poorly graded sand. By well graded sand is meant sand having a fair proportion of both large and small particles. A good Portland cement coating following the same principles is also a safe protection against the percolation of water. If concrete is mixed with a proportion of not more than one part of cement

concrete. In all concrete there are minute voids or cavities through which moisture is attracted by capillary action. It has been found that if a material sufficiently fine to fill these voids is added to the concrete it will waterproof the mass. If this foreign substance has also a water-repelling effect in addition to its void-filling properties, its usefulness is increased. Materials which fill the voids without having any chemical action are known as inert fillers. Those which react or combine with each other or with the cement are known as active fillers.

The U. S. Bureau of Standards performed tests using a mortar compound of one part Portland cement and four parts sand. To this mortar were added various inert materials ground to pass a 200-mesh sieve. Twenty per cent. by volume of these were added. It was found that New York clay and fire clay made the mortar impervious to water or moisture for the period of fifty-two weeks covered by the test. There are a number of waterproofing compounds on the market containing some active agents but which are composed largely of some inert material to which their value is probably due to a great extent.

The Sylvester method of waterproofing consists in using fat acids and alum, which combine chemically to form insoluble compounds. In some of the com-

pounds this is somewhat modified by the addition of void-filling mediums and various materials which have more or less effect on the water-resisting power of the compound. The customary method of applying the Sylvester method integrally is as follows: To the cement and sand mixed dry add three-quarters of a pound of pulverized alum for each cubic foot of sand. To this add water in which has been dissolved three-quarters of a pound of soft soap to each gallon of water. Mortar mixed in this manner is but little inferior in strength to ordinary mortar and is impervious to water. In patching a concrete wall at a point where water leaked through, the following method was used: The opening was enlarged part of the way through the wall to give sufficient room to place concrete. The small hole through which the water came was plugged with a stick of wood wrapped with burlap. A form was placed over the opening and concrete poured in which had been mixed with water prepared an hour previously by the Sylvester method. To the cement was added two per cent. of bicarbonate of soda to make it quick setting. To the water was added one-third pound of concentrated lye and three-quarters pound of powdered alum for each gallon of water.

Compounds Used for Coatings

Some compounds which are used integrally are also recommended for coatings. One of the best coatings is paraffine applied hot. Paraffine applied cold is a method sometimes used and is accomplished by dissolving the paraffine in some volatile liquid which evaporates, leaving the paraffine as a coating. Paraffine applied in this manner penetrates to considerable depth, but often requires several coats. It will not adhere to a wet surface. Aside from bituminous membrane coatings perhaps the best coating which can be applied is in the form of fine iron dust together with sal ammoniac and other materials which have a corroding effect on the iron. The iron dust penetrates somewhat into the pores of the concrete and the corrosion set up by the sal ammoniac which becomes active in the presence of the water enlarges the volume of the iron, closing the pores and forming an impermeable surface. There are several waterproofed cements which if carefully used may have a somewhat more impervious effect than ordinary mortar.

The Sylvester Process

The Sylvester process is applicable as a surface coating. It is applied in alternate coats of soap and alum. Three-quarters of a pound of castile soap is mixed with one gallon of water, and another mixture prepared of one pound of alum to eight gallons of water. It is necessary to first thoroughly clean the surface and then apply a coat of the soap solution boiling hot, using a flat brush. Care should be taken to avoid frothing the mixture in the course of its application. After this coat has remained twenty-four hours it is to be followed by the alum solution applied over it, at a temperature of about 60 or 70 degrees Fahrenheit. Twenty-four hours later apply another coat of the soap, and so on, using two or more coats of each. During the time of applying the coatings the temperature of the atmosphere should not be lower than 50 degrees Fahrenheit. Portland cement mortar used as a coating will make a waterproof wall if well-graded sand is used and the mixture made rich enough to fill all voids or a void-filling material added to take its place. There are a number of bituminous coatings which are applied cold and are to be used under a finish plaster coat or protected from the weather in some such manner. This is necessary on account of their being held in suspension by oils which will not stand exposure. In underground work bituminous coatings applied hot to the outside of the wall are as effective as anything. Often these coat-

ings are reinforced with felt. Sometimes a thin waterproofing wall is built and covered on the inside with felt laid in asphalt. Against this is built the main wall of the structure, leaving the waterproofing firmly between the two walls. Cold process bituminous coatings are sometimes used in the same manner, reinforced with burlap.

The asphalt used on good work should be of the best grade of Bermudez, Alcatraz, or Lake asphalt, containing not less than 95 per cent. natural bitumen soluble in rectified carbon bisulphide or in chloroform. The remaining ingredients should be such as not to exert an injurious effect on the work. Not less than two-thirds of the total bitumen should be soluble in acetone. The asphalt should lose not more than 4 per cent. of its weight when maintained at a temperature of 300 degrees Fahrenheit for ten hours. The felt used on first-class work should be dipped in asphalt and should weigh not less than fifteen pounds per square of 100 ft. Waterproof layers on the ground may be placed directly on the bottom, but should preferably be laid on a concrete floor four to eight inches thick. It is customary to spread a layer of asphalt under the first coat of felt. Each strip should be lapped two inches. It is better practice to shingle the strips, lapping 32-inch felt 22 inches over the first strip in three-ply work. Three strips at a time are usually laid, mopping the hot asphalt on ahead of them as they are rolled across the floor.

Brick Floors Laid in Asphalt

In some cases the floor on which the felt is to be laid is built of brick, laid in asphalt in several layers.

If the outside of a foundation wall can be drained it is well to lay drain tile along the outside footing to carry off the water. If this is done it will take away a large amount of water that would otherwise have to be kept out by the waterproofing. This is a point which as a rule is not sufficiently emphasized. Subsoil drainage will lengthen the life of the waterproofing many times and should never be neglected where possible. Backfilling above the pipe should be of a porous material, such as gravel or broken stone, allowing the water to reach the pipes without exerting pressure on the waterproofing.

In waterproofing against pressure it is sometimes necessary to lay a reinforced concrete floor strong enough to resist the upward pressure of the water. This method was used in repairing a leaky coaling pit against a 10-foot head of water. There were several leaks in the floor and the wall was quite damp. The water was removed by means of steam syphons and a sump put through the floor to relieve the pressure. The syphons were then operated in the sump. When the pressure had been relieved the sump was cemented in place and the leaky spots cut out and made larger and filled with quick-setting cement. The walls were coated 6 feet high with waterproofed cement. Four inches above the floor holes were drilled in the walls 12 inches apart, and the floor anchor irons were set 9 inches in the concrete and projecting 6 inches above it, 3 feet on centers. Into the holes in the walls were set $\frac{3}{8}$ -inch reinforcing rods 6 inches apart and spanning the floor in both directions. These were held down by the anchor irons and wired in place at intervals. The alternate rods were set into the holes in the walls so that each rod was anchored in the wall at one end. Then a 6-inch concrete slab was put in place and coated with waterproofed cement. After the concrete had set, the sump was capped, effectually stopping all flow of water.

In preparing the surface of a wall for waterproofing with a waterproofed cement mortar, the surface is first chipped with a hammer and sometimes washed down with a solution of one part hydrochloric acid to ten parts water. This exposes the aggregate and

affords a clean surface on which to plaster. After the acid has remained about fifteen minutes it should be washed off with a hose under a good pressure. Before applying the mortar drench the wall until it has absorbed all the water it will. If there is any fear of not obtaining a perfect bond a coat of some good waterproof bituminous binder should be applied. There are a number of these manufactured. Before the wall has dried mix up some neat cement waterproofed with the compound to be used and with this of the consistency of cream slush the surface. While the slush coat is still wet apply a scratch coat three-eighths of an inch thick, and before this is set hard apply a finish coat of the same mortar, the two plaster coats being mixed in proportions of one part cement and two or two and a half parts of sand, mixed with the waterproofing compound. Some of the waterproofing is supplied with the sand, cement and waterproofing compound already mixed dry, and it is only necessary to add water and apply. It is customary to use a somewhat thicker coating on the floor. When the work is finished, go over it thoroughly with a hammer, sounding it, and cut out and replace any part which has a hollow sound indicating imperfect bond. If the scratch coat has set before applying the finishing coat, it should also be slushed before applying the final coating. When water is coming in through holes in the wall the method followed is to insert tubes of metal in drill holes, draining the leaks. The openings around these tubes are cemented, and when the mortar has set the tubes are plugged up

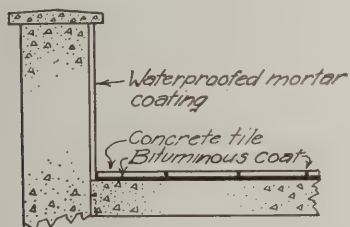


Fig. 4—Method of Waterproofing Roofs and Reservoirs

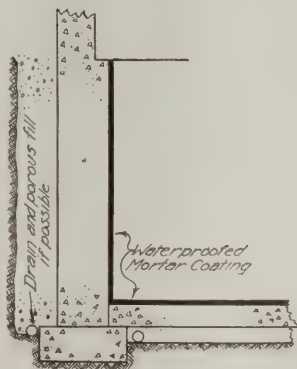


Fig. 5—Interior Plaster Coating, Suitable for Stopping Leakage in Old Structures

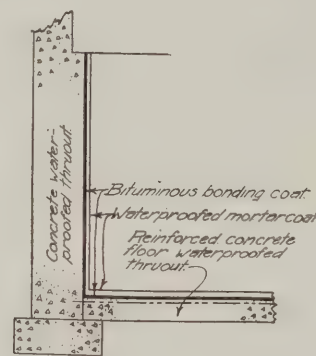


Fig. 6—Waterproofing Against Heavy Pressure

Waterproofing Cellar and Other Masonry Walls

and covered with the coating. This is known as bleeding.

In waterproofing against heavy pressure the triple seal method is often used. By this method the wall is waterproofed integrally, a bituminous black bonding coat applied on the interior of this and the whole plastered with a waterproofed mortar. Reservoirs are best made waterproof by laying a concrete bottom, covering it with bituminous layer and laying waterproof mortar over it, divided into squares by expansion joints, the joints being filled with the bituminous compound. Roofs are waterproofed in very much the same manner, being covered with bituminous compound, over which is laid cement tiles with bituminous joints. The parapet walls are protected by a coating of waterproof cement.

It must be borne in mind that concrete work is not always perfectly done and while it may be made watertight it is not well to rely upon the mixing and placing the concrete to get a waterproof job, since experience has shown that many masonry structures are leaky if built below water or sea-level. So that, while it is possible by careful work to make concrete practically watertight it is advisable to use some system of waterproofing, with subsoil drainage if possible.

The weathering and disfiguring by cracking and chipping of masonry surfaces is due almost entirely to the action of water which is absorbed or drawn into the pores, and freezing, cracks off the surface.

For this reason some waterproofing substance should be incorporated in the masonry or coated on its surface. The discoloration of interior decoration, the white efflorescence on the outside of otherwise beautiful buildings, as well as the weathering of the surface can be prevented by the use of the proper method of waterproofing. Cement stucco, if properly damp-proofed, will be far less liable to crack off and check, to say nothing of the fact that its appearance will be longer preserved and its life lengthened.

The cost of the various methods is a question which arises when we come to compare the relative economy of each. The Journal of the American Society of Engineering Contractors for October, 1911, gives the following costs for the different methods:

Sylvester Process, $\frac{1}{2}$ cent to 4 cents per square foot.

Damp-proofing masonry walls, two coats applied in place, 2 cents to 4 cents per square foot.

Melter Paraffines, 5 cents to 8 cents per square foot

Intergral, adds about 10 per cent. to cost of mass concrete.

Cement coatings with waterproofing compounds, 8 cents to 30 cents per square foot, depending upon conditions.

Hot coal tar, pitch and felt. Horizontal surfaces: First ply, \$2 to \$4 per square of 100 square feet; additional plys, \$1.50 to \$2.50 per square; vertical sur-

faces, add anywhere from 10 per cent. to 25 per cent.

Cold process, felt or burlap, same as commercial asphalt.

Pressure work, one ply, \$4 to \$5 per square.

Commercial asphalt and asphalt felt, add 15 per cent. to 60 per cent. per ply, depending upon conditions.

Special asphalts and felts, add 30 per cent. to 50 per cent. per ply. Black compounds sell for 75 cents to \$1.25 per gallon.

Asphalt mastic, 1 inch, 15 cents per square foot.

It has recently been discovered that concrete may be waterproofed by the incorporation with it of a mineral oil residuum. If oil is mixed with concrete it entirely disappears in the mixture and does not separate from the other ingredients. Laboratory and service tests have proved that concrete can be damp-proofed by the admixture of oil. The oil in the mixture does not injure the tensile strength of one or three mortar if the oil does not exceed 10 per cent. by weight of the cement. This amount of oil has a slight but not serious effect on the compressive strength of the concrete. Oil-mixed mortar requires about 50 per cent. longer to set than ordinary mortars, but its increase in strength is almost as rapid as that without oil. It is almost non-absorbent of water, and resists the permeation of water under pressure. The bond on plain bars is reduced by the admixture of oil, but deformed or twisted bars, wire mesh or expanded metal have the same grip as with plain concrete.

ANCIENT WROUGHT IRON DOOR FITTINGS

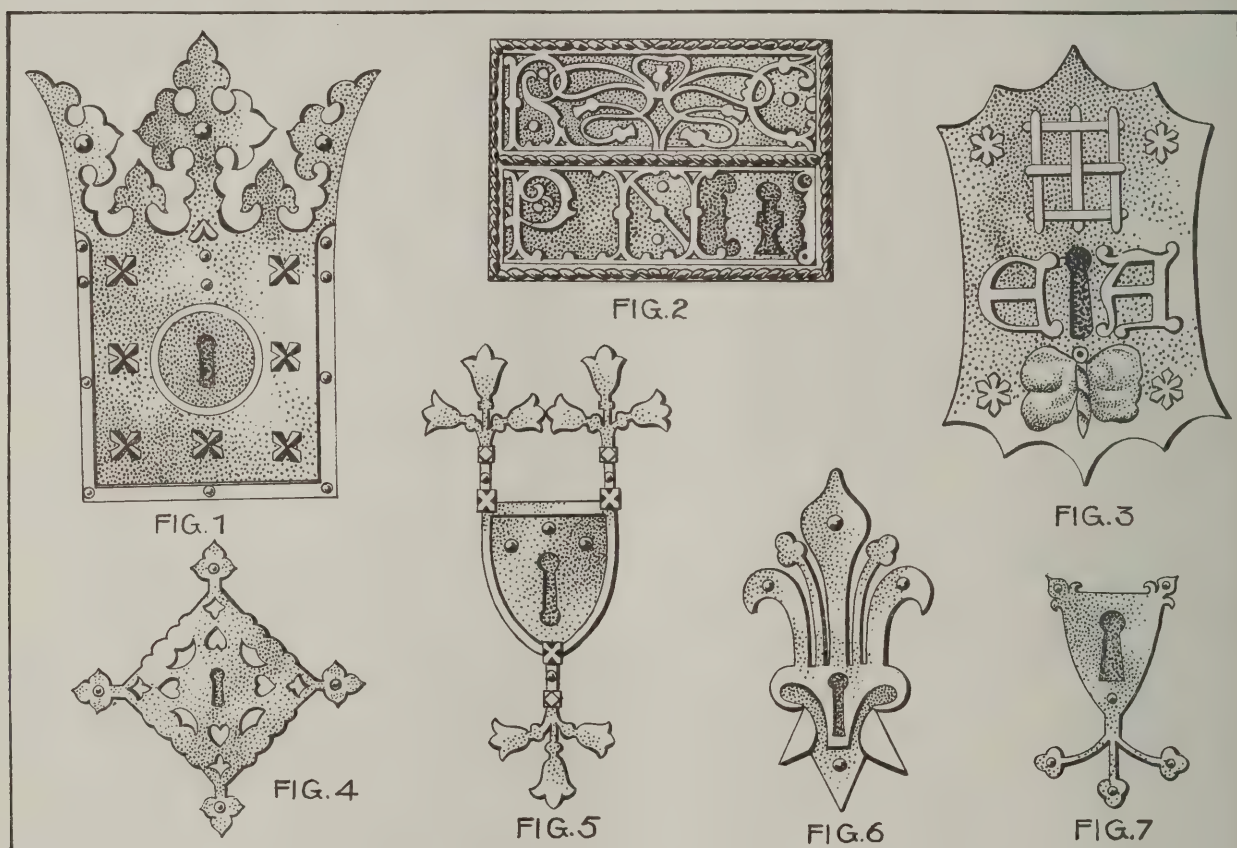
Illustrations Showing the Ornamentation Given to Old Lock Plates Used on Doors of Cathedrals and Manor Houses in Mediæval Times

THE tendency in mediæval times to ornament the doors of churches, manor houses and other buildings with quaintly designed wrought iron fittings, more especially in the way of old lock plates or escutcheons, as we would call them in current hardware parlance, is well illustrated by the designs reproduced herewith from a London contemporary. Take, for example, that shown in Fig. 1, which represents a lock plate from Exeter Cathedral, Devonshire, and is a good example of fifteenth century work. It will be seen that the upper portion of the plate is cut out in an ornamental manner, while the sides and bottom of the plate have a strip of flat iron riveted on the outer edge. A circular piece of iron with chamfered edge is riveted on the lower center of the plate and through this the keyhole

and is indicated by the darker portion of the plate.

A lock plate of probably about the same date as that just described and taken from the Cathedral of Hereford is illustrated in Fig. 3. In this example the plate is cut to shape and the keyhole is located directly in the center. On either side of the keyhole are the initials "E" and "A" of quaint type. The ornamental parts are cut from a plate of iron, a plain portcullis being fixed at the top and a rude figure of a butterfly just below the keyhole. The initials are probably those of the founder of the chapel and a portion of the family coat of arms.

There is shown in Fig. 4 a simpler lock plate of much smaller size, this example being diamond shaped and the ornament is entirely cut out of the iron plate. The



Ancient Wrought-Iron Door Fittings—Some Illustrations Showing Their Ornamental Nature

is cut of the required shape for the key. This lock plate is fixed on to the wood door by means of ornamental square-head screw pins. They are so arranged as to form an ornamental relief to the severely plain surface of the square portion of the plate.

In Fig. 2 of the engravings is shown a lock plate of more ornamental character than the one just described. This probably existed either at the end of the fifteenth or the beginning of the sixteenth century and is taken from the Cathedral of Norwich. In this the plain oblong plate is ornamented by a twisted beading of round iron riveted on to the outer edge and covering the flat strip or surface of the iron. The other ornaments on the plate are cut from plate iron and are riveted on to the under plate. In this case the keyhole, it will be observed, is in the lower right-hand corner

lock plate is fixed by pins on the four leaf ornaments.

Fig. 5 illustrates one of the very ornamental keyhole plates of a period late in the fifteenth century. Here the plate is enclosed with a rim of flat iron. On the plate is riveted by means of square-head rivets three ornaments cut out of plate iron and each having three lilies at its termination. In this case the keyhole is in the center of the plate.

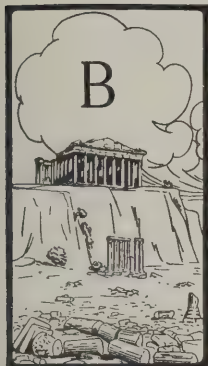
Fig. 6 represents a keyhole escutcheon from the church at Walsingham. In this example the plate is cut out and that portion around the keyhole is strengthened by a small half-round ornament riveted to it.

In Fig. 7 is shown a simple keyhole escutcheon from Devonshire. This is cut out in shield form with ornamental leaves at the two top corners and having three trefoil ornaments in curved stems at the bottom.

LEGAL ASPECTS OF CONTRACTORS' BONDS

Builders' Relation to Surety—Obligations Covered by Bond—When Surety Is Released—Effect of Change in Plans

By A. L. H. STREET



plainly fixed by the instrument. Using Shylock's words, the surety is entitled to say to the obligee: "Look to your bond."

Since builders' bonds are usually given only to afford security to the owners for the performance of building contracts, the builder's obligations are not thereby increased, except as he becomes liable to his sureties to reimburse them against loss resulting to them from the suretyship.

The responsibility of sureties is usually brought into question when the contractor is insolvent, and in such cases the latter is often apt to be indifferent as to the outcome, but he has a practical interest in the matter, in view of the fact that the surety is entitled to look to him for reimbursement. And since the surety is entitled to reimbursement only for payments which he was bound to make under the bond, it becomes interesting to the contractor, as well as to the surety, to know the extent of the latter's liability.

Scope of Surety's Obligation

A builder's surety is bound equally with the contractor for the performance of the work, and is equally responsible in damages for any failure in performance. Thus the surety is presumed to know the terms of the contract fixing a time limit for completion of the work, and, hence, the owner need not draw his attention to that provision. (Alabama Supreme Court, 57 Southern Reporter 750.)

Generally, a contractor's bond is so clearly worded that there is no substantial ground for dispute as to just what obligations are secured by it, but cases have frequently arisen where the point has been in doubt, and particularly as to whether a certain bond was intended for the benefit of laborers and materialmen, as well as to secure satisfactory performance of the contract work. If the bond was executed after the contract was, and any inconsistency appears between the two instruments, the bond controls. (Missouri Court of Appeals, 113 Southwestern Reporter 650.) A bond of a contractor, in building a schoolhouse, to provide the labor and materials at his own cost, does not make the sureties liable to materialmen for the price of materials furnished the contractor. (Indiana Supreme Court, 65 Northeastern Reporter 747.) But they are liable when the bond expressly requires the contractor to pay for materials. (Indiana Appellate Court, 53 Northeastern Reporter 295; Nebraska Supreme Court, 68 Northwestern Reporter 1029.) And it has been held in Michigan that a bond requiring the

contractor to protect the owner against loss on account of any breach of the contract, renders the surety liable for liens filed for labor and materials. (Michigan Supreme Court, 120 Northwestern Reporter 787.)

When a building contract makes the plans and specifications a part of the contract, and the bond requires construction of the building according to the agreement, the sureties are bound to performance of all the requirements of the plans and specifications. (52 Missouri Courts of Appeal Reports 632.) Sureties are not liable to the owner for damages resulting from the use of a different kind of plaster from that called for by the contract, without their consent and with the supervising architect's approval. (Maryland Court of Appeals, 81 Atlantic Reporter 1.) Nor are they liable for the contractor's failure to construct an additional building under a contract entered into after the first contract was made. (Arkansas Supreme Court, 102 Southwestern Reporter 372.) On abandonment of work by contractor, his surety is liable for the cost to the owner of completing the work, if the surety was afforded opportunity to complete it. United States Circuit Court of Appeals, 117 Federal Reporter 814.)

Acts which Release Surety

Suits on builders' bonds very often involve a claim by the sureties that they have been released from liability on account of some act of the owner, to which the surety has not assented, whereby the suretyship has become more hazardous, as where the owner makes payment to the contractor in excess of the value of work already done, thus creating an incentive to abandonment of the work by the builder, or where the obligations of the builder which the bond secures are increased. The courts hold that if the surety's responsibility is so increased without his consent, he may claim a release from all liability.

But a distinction is ordinarily drawn between the rights of sureties for accommodation and those for compensation. It is held that a compensated surety will not be released from his obligation by a departure from the contract, without his consent, unless the departure operates to his prejudice. (Washington Supreme Court, 112 Pacific Reporter 517.) But, in the last cited case, the court decided that a subcontractor's surety was released from liability where \$3500 was paid the subcontractor before any work was done, \$6,632.46 before any material was delivered, and more than \$9,000 before any payment was due.

Most of the courts hold that the surety is discharged by the owner's act in making payments to the contractor before they are due, on the theory that the contractor's incentive to live up to his contract is thereby lessened. But in several states, including Alabama, Missouri, New York, Pennsylvania, and Wisconsin, it has been held that if the clause in the building contract as to when payments shall be made is intended to be exclusively for the owner's benefit, he may waive it, without discharging the surety. If the contract does not specify when the price shall be paid, the surety is not affected by a payment made before completion of the building, and the contractor's abandonment of the work. (Missouri Court of Appeals, 113 Southwestern Reporter 1134.)

The Appellate Division of the New York Supreme

Court has held that where a building contract provided that when \$10,000 worth of work should be done, 80% of that amount should be paid, the contractor's surety was not discharged from liability by a payment of \$1000 when \$3000 worth of work was done, since no prejudice could result to him. (120 New York Supplement 496.)

When the bond obligated by the contractor to protect the owner against liens, the latter is entitled to discharge lienable claims without being regarded as having made such an unauthorized payment to the contractor as discharges the surety. (Kentucky Court of Appeals, 118 Southwestern Reporter 967.)

Change in Plans Discharges the Surety

Under decisions of the courts of most of the states any material change in the plans and specifications discharges the surety, but trivial changes do not. But any substantial increase in the cost of the work to the owner, is a substantial change within this rule. Thus the California District Court of Appeal released a surety where the cost of a building was increased \$315 over an original agreed price of \$16,300. (85 Pacific Reporter 156.) And in a recent case (106 Southwestern Reporter 603), the Missouri Court of Appeals held that a surety was discharged through changes in work, though they involved only \$18.75 increase in the cost. (106 Southwestern Reporter 603.) Change in plans by extending an upper story 21 feet, made without the surety's consent, released his liability. (Arkansas Supreme Court, 47 Southwestern Reporter 409.) But a change of the site of a building does not have that effect, unless it involves an increase in the cost of doing the work. And when the contract provides that changes may be made in the plans by agreement of the parties, the surety is not discharged by changes not radically altering the original contract. (United States Circuit Court of Appeals, 115 Federal Reporter 697; Indiana Appellate Court, 52 Northeastern Reporter 776; Iowa Supreme Court, 100 Northwestern Reporter 556.) And this is held to be true, even though the change increases the cost of the building. (California Supreme Court, 68 Pacific Reporter 576.) Nor, where the contractor abandons the work, is his surety discharged by the owner taking charge of the work, without obtaining a certificate from the architects of abandonment, as provided by the contract. (Iowa Supreme Court, 100 Northwestern Reporter 556.)

Unauthorized Change by Architect Does not Release the Surety

An unauthorized and unratified act of architects in making changes without the owner's consent does not release the surety. (89 Missouri Courts of Appeal Reports 201.) But it was lately held by the United States Circuit Court of Appeals that the surety on a federal building contractor's bond was released from liability by the government taking possession of the work on default of the contractor, and making a substantially different contract with a third person, even though the contract provided for changes in the work. (194 Federal Reporter 611.) This principle is applicable to private, as well as government, contracts.

The right of sureties to release from liability on account of a change in the terms of the contract without their consent is not affected by any question whether the substitute contract has been performed by the builder, it being the execution, and not performance, of the modified agreement that affects the sureties' rights. (Arkansas Supreme Court, 47 Southwestern Reporter 409.)

That the surety is not discharged by the owner's act in permitting the contractor to complete the work after expiration of the time fixed by the contract, has been

decided by the Appellate Division of the New York supreme Court. (65 New York Supplement 1051.)

Under the rule, to be released from liability, the sureties must show that they were prejudiced by a violation of, or departure from, the original contract, it is declared by the courts that failure of an owner to insure the building, as agreed is immaterial, if there is no fire. (Indiana Supreme Court, 72 Northeastern Reporter 852.)

Method for Cleaning Stone Work

A builder in Virginia had a contract involving the use of brick work with granite trimmings and he found it necessary to clean the stone work. He made the attempt with dilute acid, but it did not give satisfaction, although the stock brick around the trimmings cleaned up very nicely. The granite, however, still showed the streaks of dirt. He stated his case in a recent issue of *The Painters' Magazine* and the suggested remedy was as follows:

Builders' acid, which is equal parts of muriatic acid and water, will remove spots of mortar on brick or stone work, but is not the right material for cleaning stone that is begrimed from smoke and dirt. To accomplish this, apply to the surface, with a long-handled fiber brush, a strong solution of caustic soda or pearl ash. Let it remain on for about fifteen minutes, then wash several times with clear water, using a stiff brush or broom for the purpose. If this will not be effective enough, scrub the stone with a stiff fiber brush, using soft soap and concentrated lye and sand, allowing this to remain on the stone until nearly dry, then rinse with clear water, using a brush to remove the cleansing material. Protect your hands with rubber gloves.

Sheet Metal in Architectural Design.

The architect and designer are ever on the alert to discover that which is new, artistic, quaint, or even foreign in appearance. Even now the exterior of buildings, both business and residential, including apartment houses for city erection, are taking on new and improved forms. The moment any architectural feature becomes hackneyed, even though it has in former years been surrounded by an atmosphere of romance and elegance, an active and fertile brain is already seeking something new or yet untried. Houses of the Mexican or Spanish type, having wire cornices, tile roofs and ornamental balconies, have been built in California and other sunny climates, and are now finding their way into the East. Roofing tile of quaint design can be made of copper as well as of terra cotta; small detail for exterior work can be beautifully rendered in either copper or zinc, and crestings and finials of copper look as well as if of tile or solid bronze. Much copper is being used now, says *Sheet Metal*. It oxidizes beautifully and the color desired can be attained by chemical means. Of course, when a new structure of any character is to be erected, the architect is looked to in the matter of design, but in many cases the architect does not always know the possibilities of sheet metal or keep them in mind.

It is not without reason to say that it is within the field of the sheet metal contractor, not only to note the trend of things in building matters, but to make it his business to see that the architect is kept posted on the utility and beauty of sheet metal, not alone by suggestions, but by keeping his showroom well supplied with the most recent creations and seeing that it is visited frequently by architects.

HOISTING RIGS FOR THE BUILDERS' USE—I*

Some General Information Relating to Various Forms of Hoisting Rigs That the Builder Usually Erects for Himself

By EDWARD H. CRUSSELL



PRESENT day hoisting devices are of many different designs and have been improved to wonderful efficiency. Most of those used in the erection of modern structures are familiar to all building mechanics in the larger cities. These devices are usually erected and operated by workmen who are specialists in that line and it is not the intention of the writer at this time to say much regarding either their respective merits or operation. The idea of the present series is rather to discuss some of the hoisting rigs that the builder usually erects himself and to offer a little general information along this line to those who not having had the necessary experience might be somewhat at a loss if called upon to erect a derrick, gin pole or other hoisting rig in an emergency.

The ancient Greek Archimedes is reported to have said that he could lift the world with a lever if some one would supply him with the fulcrum. He might with equal confidence have offered to raise it with pulley blocks if provided with a place to which he could fasten them. That is the chief thing required in hoisting and usually the thing most difficult to obtain—some place or thing high enough and strong enough to which the upper block of the tackle may be fastened. It is by no means an uncommon occurrence for workmen to spend all the way from several hours to a day or more erecting an appliance for the purpose of raising a smoke stack, roof truss or something similar which can, once everything is ready, be lifted and set in place in a few minutes.

Of course, this is not always the case. There are many instances where the tackle can be attached to some portion of a building such as a floor girder or roof beam and no derrick is needed, and although we have stated that some place to which we can hitch the tackle is the chief thing required, that does not mean it is the only thing of importance. Everything connected with hoists and hoisting is important, from the erection of the derrick and fastening of the guy lines to the selection and arrangement of tackle and slings.

In the course of many years of practical work the writer has observed that the proper arrangement of the tackle or pulley blocks is an item not always thoroughly understood even by those who have had considerable experience in this line and he feels there could be no place more suitable than the commencement of this series in which to offer some simple information on this subject.

We often hear such queries as "What power can I get with a set of double pulley blocks?" or "How much more will I get with triple blocks in place of double ones?"

The work, power or energy given up by pulley blocks or any other machine can only equal the power applied to them minus the amount absorbed by friction. Pulley blocks do not give us an increase of

power—if they did we would have perpetual motion at once—but they enable us to move a weight greater than the power by moving the power through a greater distance.

The unit by which work is measured is the foot-pound, which equals one pound raised one foot. The amount of work done is equal to the amount of pounds resistance overcome—or equal to the number of pounds raised—multiplied by the distance in feet through which it is moved.

Ten pounds raised one foot, is equal to ten foot-pounds. One pound raised ten feet is also equal to ten foot-pounds, and it is upon this principle that the pulley blocks are arranged; the power on the fall line, multiplied by the distance through which it moves, is equal to the load multiplied by the distance through which it moves, minus the amount absorbed by the friction of the apparatus.

The foregoing is set forth in an endeavor to illus-

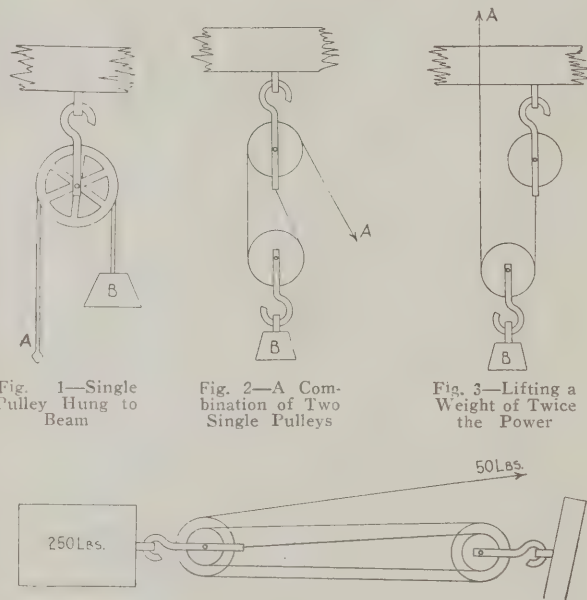


Fig. 1—Single Pulley Hung to Beam

Fig. 2—A Combination of Two Single Pulleys

Fig. 3—Lifting a Weight of Twice the Power

Fig. 4—Arrangement Where Power is Equal to 5 Times the Weight

Hoisting Rigs for the Builders' Use—I

trate the principle upon which the pulley blocks work and not as a method of computing the power of them. There is a better method for this latter purpose which we will now proceed to illustrate.

Fig. 1 shows a single pulley hung to a beam. It is evident that this pulley gives a change of direction only, for if the weight is lifted by pulling on the free end of the line, the power and the weight both travel equal distances and must be equal to each other. Further proof is not needed for it can at once be seen that if a weight was used in place of the power at A, this weight would have to be equal to B to preserve a balance.

Fig. 2 is a combination of two single pulleys. In this we can at once see that the power moves twice the distance traveled by the weight, for if the movable pulley B is lifted one foot, there will be one foot of slack in each of the two parts of the rope supporting it and the power must move through a dis-

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tance of two feet in order to take up this slack, so that a pull of one pound at A will lift two pounds at B. In this, as in the previous illustration, the fixed pulley gives a change of direction only and if the end A instead of being taken over the fixed pulley is taken straight up, as shown in Fig. 3, the effect is the same with the exception that the power now moves in the same direction as the weight and a pull of one pound at A will raise two pounds at B as before.

Of course, in Fig. 3 the fixed pulley answers no useful purpose because the rope might just as well be tied to the beam as to the pulley, so that Fig. 3 really shows us how we may lift a weight equal to twice the power by means of a single pulley and in connection with Fig. 1, will help to explain how much depends upon the proper arranging of the tackle. Fig. 1 shows the use of a single pulley where the power and weight are equal, and Fig. 3 a single pulley under different arrangement where the weight is equal to twice the power.

Before going further, it may be well to endeavor to prove the truth of the foregoing. There are many workmen, who have not had experience in this line, or who have not given the matter study, and there is a very general belief to the effect that the more pulleys the more power, and it may need something more than the mere assertion to prove that the single pulley in Fig. 3 has the same lifting power as the two pulleys in Fig. 2.

Referring to Fig. 1, let us suppose the weight B to equal 50 lb., then the power at A must also equal 50 lb. in order to balance it and the strain or force at C will be equal to A plus B or 100 lb. Fig. 3 is merely Fig. 1 turned upside down and if the power at A equals 50 lb. applied, the answer is the ultimate power exerted by the movable pulley. In Fig. 4 the number of ropes leaving the movable pulley is five; the force equals 50 lb. and $50 \times 5 = 250$ lb. the weight that can be moved. To get the full power of the tackle the force must pull in the same direction as the load, as in Fig. 4. It is not often possible to arrange a vertical tackle in this way, but a horizontal one can nearly always be so placed and this little kink will often give just the amount of extra power required.

Broadly speaking, the force exerted by the tackle depends entirely upon the movable pulley, the fixed pulley giving a change of direction only. This is so, whether the pulleys have one sheave or more.

(To be Continued)

Rapid Method of Coloring Drawings.

Every draftsman has occasion at one time or another to color a drawing or a whiteprint. The use of colored inks is unsatisfactory; cross-hatching in colors obscures the details and is slow, while water colors have the disadvantage of slowness besides being difficult to apply evenly. A quick and satisfactory method of coloring involves the use of ordinary wax crayons and gasoline, says the *Engineering and Mining Journal*. Crayon of the color desired is applied and then rubbed with a piece of cloth, wet with gasoline, until the color is even, and extended to the limits desired. If it overruns the lines, it can be erased with a pencil eraser. Some colors, particularly the yellows, purples, greens and light blues, produce much better results than others. It is probable that the gasoline dissolves the wax from the crayon, leaving the pigment as an impalpable powder, which, when rubbed over the paper, colors it uniformly. The method is applicable with equal success to egg-shell and smooth drawing papers and to white prints on both paper and cloth.

It is stated that the National Association of Building Owners and Managers is arranging for the preparation of a national building code.

Growing Use of Fans and Sheet Metal Ducts.

Since the present century started there has been an appreciation of the value of ventilation that has made the production of fans a large industry, and the consumption of sheet metal for the ducts used in connection with them mount up in tonnage to surpass that in old-established industries. The use of fans has grown correspondingly with the higher efficiency, lower cost of operation and the more compact forms that have become popular. An important influence on the growth of this industry has been the result of investigation showing the effect of dust, vapors, etc., to say nothing of the lack of ventilation in industrial establishments on the health of the workers. The showing has been productive of legislation compelling equipment to positively change the former conditions. This is apart from the laws compelling the ventilation of schools, moving picture places and other public buildings where people gather.

Fan manufacturing establishments have shown a continued growth in capacity, and yet to those who are familiar with the uses to which fans can be advantageously put it would seem that only a start has been made. It is clear that in some of the uses for fans already suggested little sheet metal work is required, but when it is reported that 150 tons have been used in one railroad terminal, 40 tons in one public building and an amount equally impressive in a hospital building some indication is given of the output that is taken in this field, and whatever increase in demand comes for fans it will be accompanied by an increase in demand for sheet metal.

Already this class of work has assumed proportions to warrant the corniceman in many instances to turn his equipment to the production of duct work and specialize in it. It has also been discovered that there is opportunity for a display of both business talent and shop craft, for the work brings its own problems and play is afforded for no small engineering ability in solving the problems encountered.

Bricks Used in New York's 1912 Building Operations

It has been computed that there were used in the buildings erected in New York City last year 1,019,250,000 bricks, which is an increase of 93,187,000 bricks over the number needed for building operations in 1911.

The cost of the great pile of brick used in last year's operations amounted to \$5,858,770, as against \$4,717,633, the cost of the pile used during the previous year. During that year bricks were 65 cents less a thousand than in 1912, when they sold for an average of \$5.74 a thousand. The greater part of the supply came from the Hudson River yards and from those along the Raritan River north of Perth Amboy.

The use of reinforced concrete in public school construction is well exemplified in the new building about being erected for the Board of Education of Nutley, N. J., at an estimated cost of \$45,000. The architect is H. King Conklin, 665 Broad street, Newark, N. J., and the general contractor is the American Concrete Steel Company, 718 Union Building, also of Newark, N. J. The contract for the carpenter work has been secured by the William Nairn Company, 222 Kearny avenue, Kearny, N. J.

A flight of stairs is easy or difficult to mount according to the relation between "riser" and "tread."

A HOUSE OF MODERATE COST CONSTRUCTION

A Dwelling in Which Comfort Is the Predominant Note. The Dormer Windows as a Prominent Architectural Feature

A TYPICAL modern American home of moderate cost is described in the present article. The roof suggests the Dutch Colonial, and the treatment of the porch goes back to the fluted Doric columns of the Parthenon at Athens, but the wide unshuttered windows of clear glass, and the exposed rafters of the dormer and porch roof, combined with the white clap-board treatment of the first story and the stained shingles of the gable and roof give the modern touch which stamps the building as of the present time.

The plan is of the box type, which converts the front hall into a reception room and puts the kitchen

frigerator, as this is placed just beyond a partition at the left of the rear entry way. The kitchen is equipped with a 30 x 30 x 6 in. porcelain roll-rim sink, a gas range and hot water boiler.

The main staircase leads to a small hallway on the second floor, which connects with each of the four bed rooms and the bath room.

All bed rooms are provided with closets and all are well lighted, the two front rooms, by mullion dormer windows, and a single window on each side; the two rear bed rooms, by a single window in each of the outside walls. The bath room, which is centrally lo-



A House of Moderate Cost Construction—Architect J. L. Theodore Tillack, New York City

into direct communication with the front portion of the building.

The fireplace in the reception hall is of rough finish red tapestry brick. The main staircase is just beyond, and is well lighted by a large window on the first landing. All the rooms of the first floor may be entered directly from the reception hall.

The parlor and dining room are about equal in size and both are well lighted, a feature of the parlor being a broad window seat surmounted by three mullion windows, from which, in the present example, is gained a beautiful view of the surrounding country. As in the case of the house illustrated on the cover page of this issue of *The Building Age* and described on page 456, access to the rear door is provided from both dining room and kitchen—in the present case through the pantry. The latter is of ample proportions, and not encumbered with a re-

cated and easy of access from all sleeping rooms, is equipped with a Standard porcelain 5 ft. 3-in. roll rim bath tub; a porcelain syphon jet water closet with white enamel seat and cover and vitreous porcelain cistern; and a Standard porcelain oval pedestal lavatory.

A linen closet is provided in the hall and from the latter a stairway leads to the attic in which is located considerable additional storage space and a maid's bed room.

Concrete used in the construction of the house was mixed in the proportion of one part Portland cement, three parts sharp sand, and five parts broken stone or gravel. The foundations are 8 in. wide. The cellar floor is composed of a 6-in. layer of cinders, over which is a 4-in. layer of concrete, with a top dressing composed of one part cement and two parts sand.

All timber, unless otherwise specified, is of spruce.

First and second floor joists are 2 x 8 in. and are bridged with 1¼ x 3-in. cross bridging. All inside partitions are bridged once in their height with 2 x 4-in. pieces nailed at each end. All headers and trimmers around stairwells and chimneys are of 2 x 8-in. members doubled, spiked together, and hung in wrought iron stirrups ½ by 2 in. in size. Partitions over walls and girders are run down to these members. All partition studding is of 2 x 4-in. hemlock, spaced 16 in. on centers. The door openings in partitions are 2 x 4-in. studs as are also sills and plates. Rafters are 2 x 6 in., spaced 16 in. on centers, hip rafters, 2 x 8 in., valley rafters 2 x 8 in., and attic floor joists, 2 x 6 in.

Spruce lath are used where finished walls occur, laid ¾ in. apart on the ceiling and ¼ in. apart on the walls. Plaster is of King's Windsor cement with a final coat of the best lime putty washed and troweled to a hardened white finish.

The floor in the bath room is laid with a cinder concrete foundation to within one inch from the finished floor surface, over which is laid a floor of Ceramic tile grouted in cement. The walls of this room are wainscoted a distance of 4 ft. 6 in. from the floor, with Keene's cement, marked off in squares to imitate tile.

The Exterior Treatment

The exterior walls of the building are covered with ⅞-in. hemlock sheathing, placed diagonally. The roof shingles are laid on ⅞ x 2-in. shingle lath, and the 18-in. Perfection red cedar shingles are laid 5½ in. to the weather. A layer of Neponset building paper, made by Bird & Son, East Walpole, Mass., is placed between sheathing and shingles.

The rough flooring of the first and second floors is of ⅞ x 10-in. tongued and grooved N. C. pine; the attic floor is of ⅞ x 3-in. tongued and grooved N. C. pine; the finish flooring for the first story is first quality oak, and that for the second floor is of tongued and grooved ⅞ x 2½-in. comb grained pine. The porch ceiling is of ½ x 3½-in. tongued and grooved N. C. pine, center beaded. The ceiling in the dining room is of the exposed beam construction. All trim on the first floor is of oak; that on the second floor, of cypress. Stairs are constructed with stringers of 2 x 8-in. stock, all treads, risers and platforms are of No. 1 oak; treads, of 1¼-in., and risers, of ⅞-in. stock.

All doors on the first floor are of No. 1 oak stock, 1⅝ in. in thickness. The exterior front door is of white pine veneered with oak on a core 2 in. in thickness. Doors on the second floor are of No. 1 cypress, with 4 cross panels. The outside door of the kitchen is of white pine. Window sashes of the first and second story are of white pine 1½ in. in thickness.

Exterior woodwork is painted with three coats of Atlantic white lead and pure linseed oil. All exposed tin work receives three coats of metallic paint. Woodwork on first and second floors receives one coat of stain and two coats of Standard varnish, except the trim in the bed rooms, which is given two coats of white paint and one coat of white enamel. The walls of the bath room and kitchen are painted, and all other walls on the main floor received a coat of calcimine. The ceiling of the porch received a coat of mineral wood filler, over which are two coats of spar varnish. Shingles were dipped in creosote stain. First and second floors received a coat of floor filler and one coat of Elastica floor varnish.

The house which is heated by steam and wired for electricity was erected for J. W. Mitchell, at Manhasset, Long Island, N. Y., in accordance with plans prepared by J. L. Theodore Tillack, architect, 119 Nassau street, New York, for L'Ecluse, Washburn & Co., of the same city. The builder was Louis Eikworth, Jr.

House Heating and Ventilating in Europe

The installation of hot water and steam heating and for large buildings the necessary ventilating facilities in conjunction therewith has made enormous strides in the last decade, says Vice-Consul E. L. Ives writing from Magdeburg, Germany. Such methods of heating were brought to that country from America and at present it seems to be the general opinion in Germany that they have so far improved the science of installation and associated research that they are superior even to the American methods. Quite recently most of the larger technical schools in Germany, notably those at Charlottenburg, Hanover and Danzig, have introduced regular courses in heating and ventilating engineering and give degrees in the subject corresponding to bachelor of science and doctor of science. A good example of the advantages the German designer has derived from a careful and theoretical study of the subject is in the cost of laying out steam and hot-water systems. An accurate knowledge of efficiencies and capacities of various sizes of pipe suitable to a given proposition enables them to greatly reduce the factor of safety in their estimates and give them a minimum cost for material. Much the same could be said where both direct and indirect radiation are used.

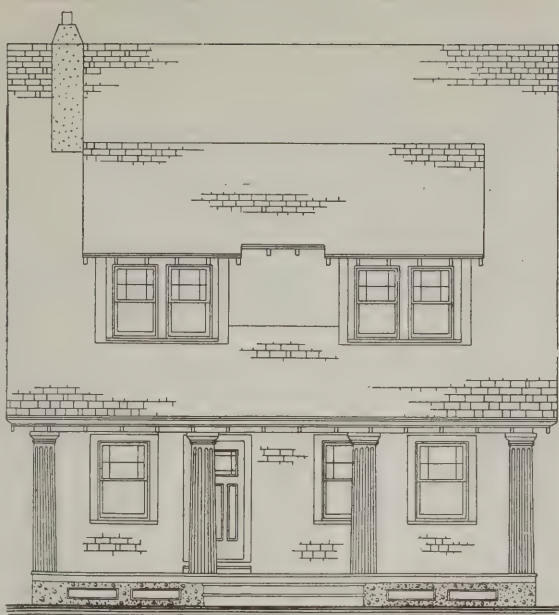
House-heating boilers for both steam and hot-water systems are sold on a basis of heating surface, the average price being \$11.90 to \$16.67 per square meter of heating surface, depending on the size and quality. Radiation on the same basis costs \$1.43 to \$1.67 per square meter of heating surface.

Use of Ventilators

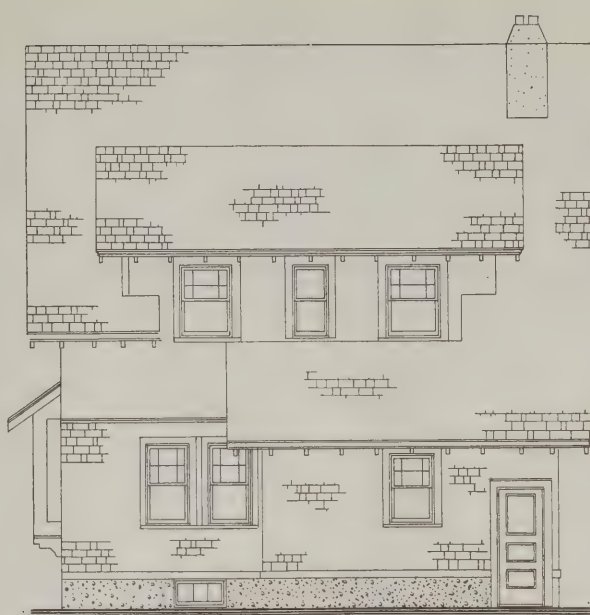
Ventilators are in use in practically every large restaurant, theater and dance hall in Breslau, but they are mechanical devices operated by electric or steam power. The large offices are seldom supplied with ventilators as dependence is placed on the open window and transom. The same is true of residences and apartments. German buildings have double windows that hang on hinges and usually open inward. During cold weather the inner as well as the outer window is kept closed and air circulation is not attempted. Bed-rooms are aired in the morning, but owing to the fact that German physicians disagree with the American as to the harmlessness of night air no opening is allowed to admit it to a sleeper. Warm rooms, however, are not popular and only the most modern houses have steam, hot-water or hot-air heating, says Consul H. L. Spahr at Breslau, but even these are usually kept at a temperature that many would consider chilly and the furnace fire is allowed to go out early in the night.

Ventilators of American make are not suited to Norwegian buildings, says Consul-General Charles A. Holder, writing from Christiania. All windows swung from hinges at the side of the casements and ventilation is generally secured by registers in the walls of rooms near the ceiling. In other buildings a system of large screened pipes is used and in some stores glass shutters are arranged in the fixed glass transoms over doors and windows. All these systems are arranged for in the construction of the buildings and are a permanent part thereof. By reason of the intense cold in winter windows are built air-tight.

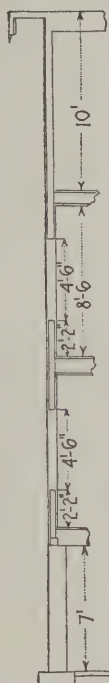
Something of a novelty in the way of store fronts is found in connection with the building at the northeast corner of Tenth and Locust streets, St. Louis, Mo. It is of stucco, designed on what is designated as *Art Nouveau* lines and marks a departure in downtown business buildings of that city. According to Architects John D. & E. H. Paulus, it is the first stucco store front in the downtown section of that city.



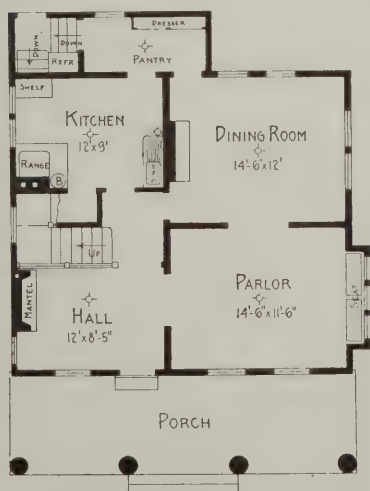
Front Elevation—Scale 3/32 In. to the Foot



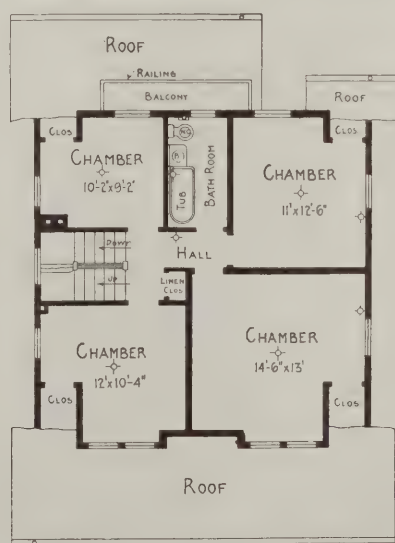
Rear Elevation—Scale 3/32 In. to the Foot

Section Through
Main Wall Showing
Floor Levels

Side (Left) Elevation—Scale 3/32 In. to the Foot



First Floor Plan—Scale 1/16 In. to the Foot



Second Floor Plan—Scale 1/16 In. to the Foot

CORRESPONDENCE

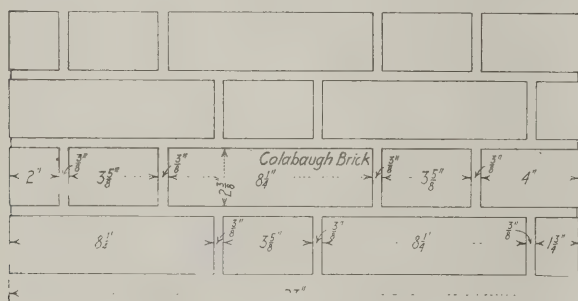
A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

Framing a Conical Roof

From J. W., Victoria, B. C.—For some time past a problem has interested me deeply and I come to the Correspondence Department for information. Will some reader show me how to obtain the various cuts, lengths of rafters, and development of plates with method of spacing, etc., necessary for the construction of a conical tower set on the top of a hip roof? For the purpose of illustration any suitable pitch may be assumed, the condition being that the vertical axis of the conical roof must coincide with that of the hips.

Flemish Bond in Brick Work

From W. M. L., Orange, N. J.—In reference to the request of "E. G. H.," Atchison, Kansas, in the August



Flemish Bond in Brick Work

issue, for information as to the proper way to lay up a 23-in.-wide Flemish bond pier, I enclose a sketch which explains itself.

The total, as per the figures of "E. G. H.," sums up for the first course $22\frac{3}{4}$ in., instead of 23.

If any one can improve on my sketch I shall be glad to read his opinion.

Plan Wanted of a Small Factory Building

From G. S. C., Philadelphia, Pa.—Will some of the architectural readers of the paper give me through the Correspondence columns the plan of a shop 40 x 40 ft. in size for light manufacturing and three stories in height? The first floor should be 3 ft. below the grade level and 5 ft. above; the second and third floors should each be 9 ft. in the clear and the building should be covered with a flat roof. The floors should be 2 in. tongued and grooved plank planed on both sides.

What distance apart should the posts be placed and what size should be the floor beams.

Which would be the cheapest construction, hollow tile, common brick or cement blocks?

Proper Method of Applying Trim

From E. E. H., West Hartford, Conn.—Although somewhat late in the day perhaps to volunteer information on the subject I would like to say in connection with the inquiry of "C. N.," who asked about the proper method of applying trim, that "grounds" have

nothing to do with the warping or twisting. The trim and the inside finish come from the factories from the dry kiln and when the material reaches the building it is and will be subject to many changes.

I notice that hazel or gum wood warps most. Sometimes the patent plasters are not thoroughly dry all the way through and of course this has a bearing upon the point raised by the correspondent. At other times there are no sash in the building and the dampness gets at the back of the wood. I find, however, by oiling the inside of the trim that it tends to keep out the dampness. Take an old paint brush and some boiled linseed oil and cover the back of the trim.

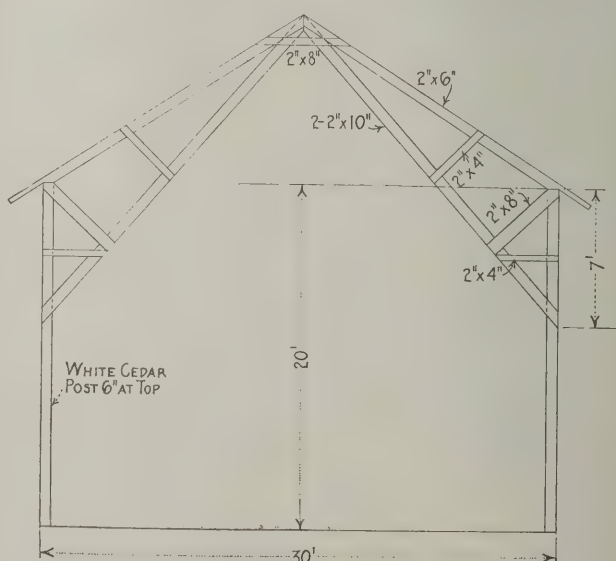
Care must be taken to nail it on the studding about every 16 in. and when this is done I have never known it to warp.

Making "Dust-Proof" Coal Bins

From E. G. H., Atchison, Kansas.—Will the architect of the very attractive frame cottage or bungalow in Eastern Massachusetts, which was illustrated and described as a leading article in the March issue of the paper, give a description of how to construct the "dust-proof" coal bins mentioned at the top of the second column on page 109 of that issue? I confess that the information would be very acceptable to me, and no doubt to other readers of the paper.

Strength of Barn Framing

From W. J. T., Cameron, Neb.—I have been a reader of *The Building Age* for about 12 years, during which time I have not asked for much information. The



Strength of Barn Framing—Bent Showing Method of Construction

paper, however, has been a great benefit to me, and I now come to the Correspondence columns with a question which I shall be glad to have the readers consider.

I am sending a rough sketch of a bent for a hay

barn, and desire to know if the framing indicated is sufficiently strong and properly braced so that the sides will not bulge nor the roof sag. I would state that hay fills the mows to the ground.

Framing a Roof of Unequal Pitch

From P. M., Mendocino, Cal.—Will "W. L. M." kindly develop for me from the sketch enclosed a roof plan similar to the one that was published in the June issue of *The Building Age*. I always experience a great deal of trouble when developing the plan to get my length of rafters, but the one of "W. L. M." in the June issue helped me a whole lot.

Is there any way to get the side cut of jacks of the one-third pitch roof to fit the 10-in. rise roof?

Answer.—In reply to the above "W. L. M." furnishes the accompanying sketches.

The roof plan shown in the diagrams may be developed according to the method explained for an equal pitch roof in the June issue, the operation consisting in constructing the slopes to a flat position.

Owing to this roof being of unequal pitches it will be necessary to first locate the plan of the hips and valleys and for this purpose the elevation at the top of Fig. 2 should first be drawn. For the main roof we have a run of 13 ft. and a height of 10 ft. 10 in., making a pitch of 10 in. rise to 12 in. run, as shown on the elevation. For the dormer on the right side the run is 6 ft. and the rise 4 ft., and for the one on the left side a run of 7 ft. 1 in. and a rise of 4 ft. 9 in., making the pitch of these roofs 8 in. to the foot run.

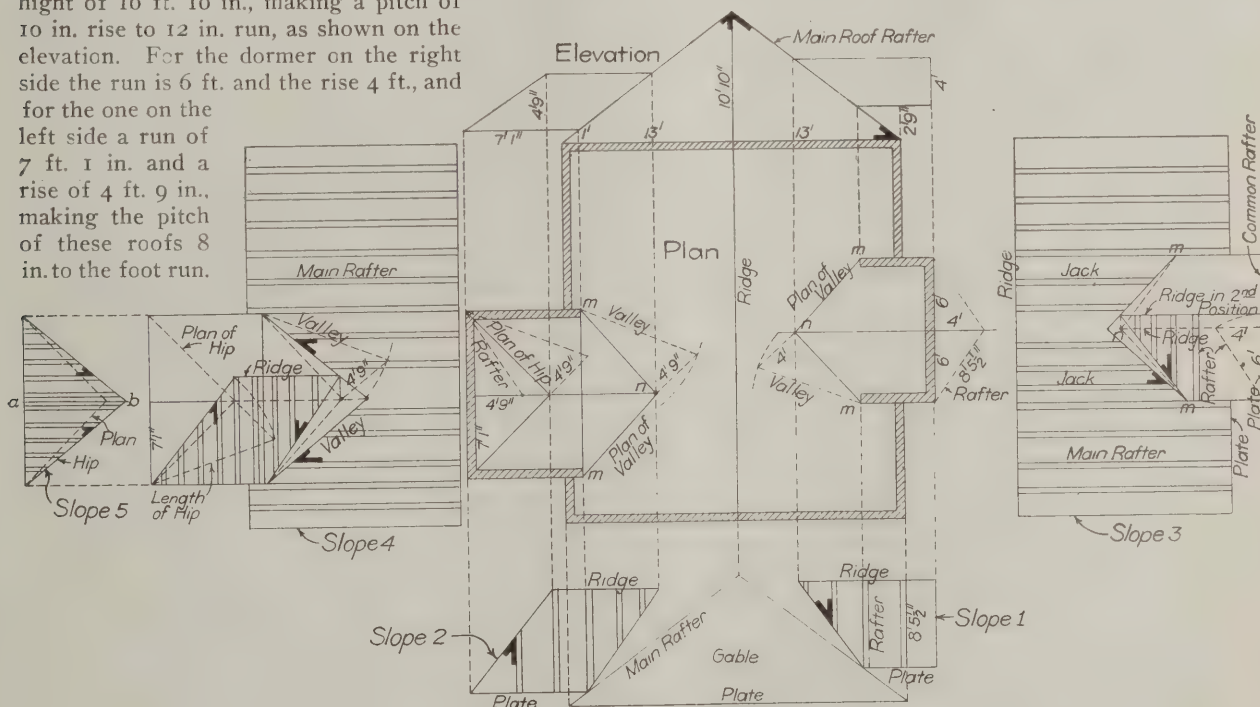


Fig. 2—Diagrams Showing How the Roof Plan May be Developed

Framing a Roof of Unequal Pitch—The Reply of "W. L. M." to the Mendocino Correspondent

The plate of the dormer on the right side is 2 ft. 9 in. above the main roof plate and on the left side it is 1 ft. above.

To find the points in the plan where the valleys meet draw projectors as shown from the elevation to *n* and *m* in the plan and connect these points to represent the plan of the valleys.

To construct the various slopes to a flat position the principle involved is to place the ridge at a distance from the plate equal to the length of the rafter, as

shown in slope No. 1 and slope No. 2 which represent the slopes of the dormers.

The same slopes are shown constructed above their plan lines in slope No. 3 and slope No. 4, where also are shown the slopes of the main roof.

From the slopes constructed in this manner the lengths and bevels for all the roof timbers may be obtained.

Slope No. 5 represents the hipped end of the dor-

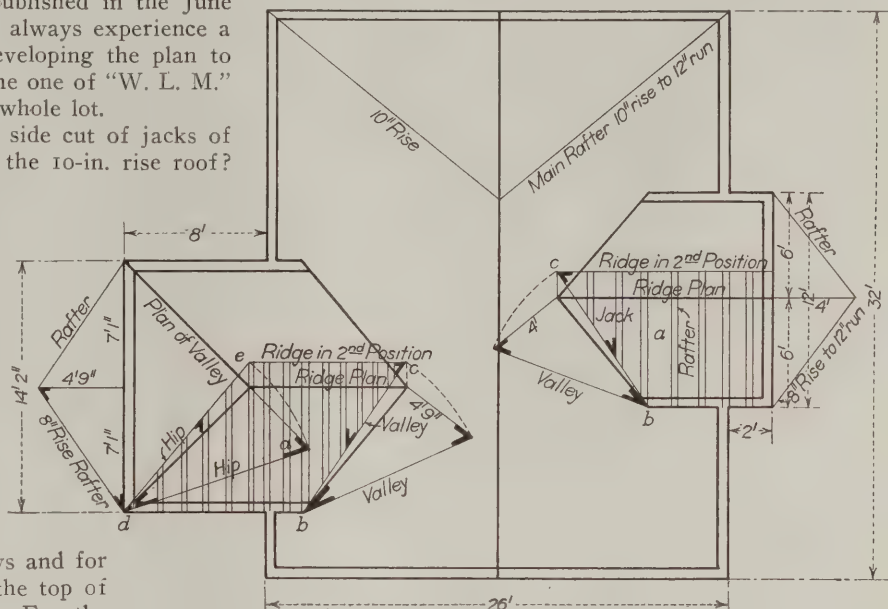


Fig. 1—Heavy Lines Show Plan of Roof as Submitted by "P. M.," and Light Lines Are Those Supplied by "W. L. M."

mer, and the line *a-b* indicating the length of the rafter. By connecting *b* with the corners as shown the slope is formed, thus giving the exact lengths of the hips as well as of all the jacks and the jack bevels.

It is not claimed for this method of roof framing that it supersedes in practical value all other methods, etc. For equal pitch roofs others are considered more simple, but when a roof is composed of different pitches it becomes useful to know how to construct its various slopes into a flat position which enables one to find all

the bevels at a glance as well as the lengths of hips, valleys and common rafters, simply by scaling the lines representing them in the drawing.

Remedy for a Damp Basement

From Contractor, Chicago, Ill.—The remedy for a damp basement depends very largely upon the location of the building. If lime is stored in the basement in shallow boxes, placed close to the walls, on the floor, the lime will absorb a great deal of the moisture. Some damp basements have been made perfectly dry by this means. The lime must be removed and fresh lime substituted when signs of dampness reappear. This treatment also tends to make a basement healthy.

If the amount of dampness is too great to be overcome by the use of lime the owner must introduce some means for obtaining a constant circulation of air. Have small windows provided so cool air from the outside may enter the basement directly and run some vertical pipes up the interior walls, similar to the tin pipes used for furnace heating. These pipes should be open at the lower end at the basement ceiling and preferably should be as close as possible to the house chimney. At the upper end they can open into the attic, or space between the top story ceiling and the roof. The difference in air temperature causes the air to move up these pipes, for the air in them is warmer and lighter than the air entering the basement from the outside.

Of course at the gable ends small gratings must be placed so the air discharged into the empty space under the roof can get out. If the current is occasionally reversed, as may happen in summer, no harm is done, for the circulation of air through the basement is what is wanted. Dampness indicates an excess of humidity and this can be removed by stoves, by the use of lime, by proper circulation of air, or by a combination of two or three of these remedies.

From D. P. B., Redford, N. Y.—It is difficult from a distance to say just what is the matter with the basement as described by "J. P. M." in the August issue. The fact that things become moldy is not conclusive evidence of dampness, as some things will mold in all parts of a house where there is no ventilation. Brick, however, will get moisture and keep it if there is any.

If his floor is lumber and 6 in. from the ground it will contribute moisture and germs and it should be replaced with asphalt concrete. The walls should be well dried out and given a good coat of hot asphalt. If the floor is cement it should be flushed with hot non-volatile oil; then run pipes from the bottom of the cellar to the chimney so as to keep the air in the basement moving all the time. Air coming in through a window has a habit of going out as one current of water will flow through another without mixing.

Architects Should Understand Mill Details

From W. M. M., New Westminster, B. C.—It was with much interest I read the article in the June issue of *The Building Age* entitled "Architects Should Understand Mill Details," and would like to put myself on record as being perfectly in harmony with John Wavrek, Jr., who is, no doubt, a mill man himself, as none but a mill man understands these peculiar troubles. Much more could be said along these lines. I am a mill man of a good many years experience, at present superintendent of a large plant here, therefore am in a position to know.

Standard double dressed stock in British Columbia is, for example, 1 x 6— $3\frac{1}{4}$ x $5\frac{1}{4}$, 2 x 4— $1\frac{5}{8}$ x $3\frac{1}{2}$, 4 x 4— $3\frac{1}{2}$ x $3\frac{1}{2}$, and so on. It will easily be seen

that when an architect's detail calls for 2 x 4 full, and 1 x 6, that it is necessary to take larger stock and dress to waste. If, on the other hand, we undertake to change sizes to correspond with standard dressed sizes, we invite trouble, as some architects object strongly to any alterations whatever. If the alterations are allowed it almost always follows that it is necessary to follow the change through the whole job, as other members must be changed to correspond. I hope to hear the views of more of the mill fraternity as I think the subject one worthy of discussion.

In the August number our friend from Victoria takes up the gauntlet and puts it over the mill man who is innocent of any intention to stir up his sarcasm. As I understand, the drawing on page 295 of the June number, it is intended merely for illustration of the subject under consideration, and as it very seldom happens that the jambs are allowed to run through to the inside wall line in brick walls, I am sure the mill man who has such frames to construct will readily understand that any alteration in the width will make trouble.

Construction of Elevated Water Tank

From W. B. Gray, Louisville, Ky.—A job of the kind referred to by "F. J. H." in the September issue will leave room for argument, no matter how it is done. It should be remembered that it is not simply what is ample today, but also what is it that will be safe a few years hence even though some settling, from compression, has taken place, some weakness developed through natural decay and some unsuspected deficiencies exist from the beginning through fault of design, oversight in construction or hidden traits of materials.

The writer has not thought it necessary to present formulæ and figures for arriving at conclusions, since Paul T. Leshar treated the subject in *The Building Age* for November, 1910.

Assuming a stock of 10 x 10-in. and other piece stuff (length not stated) on hand and to be used, the layout shown by the sketches should provide from them a substantial structure, safe, and about as easily erected as equal safety could be obtained by other sizes.

Twelve piers $3\frac{1}{2}$ ft. square equal 147 sq. ft., or about 1700 lb. load per sq. ft.—a good margin under the load for firm ground. The tank, structure, water and piers weigh about 250,000 lb. Twelve posts are somewhat safer structure than a less number would be, when age and repairing are considered. Tying all well together increases the stability throughout its service. Equal side wood under and over all posts must be adhered to so that uniform shrinkage in height will take place. The method of bracing may be adapted to the timber on hand to some extent. The sketches tell most of the story and are sufficient for almost any one who should undertake the job, though they are rough, not to scale and not in any sense complete.

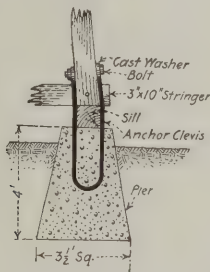
Fig. 1 shows a plan view of piers, bottom sills and posts standing; gives principal dimensions and indicates stringers tying foot of tower together transverse to the sills. Below the plan is an elevation of piers, sill, foot of posts, etc.

Fig. 2 is a detail of one of the outside piers, indicating the position, shape and attachment of the anchors. The anchor clevis consists of a 1-in. rod with welded eye ends. Use dowels—1-in. rod—extending into pier, and post on inside piers.

Fig. 3 is an elevation of the posts of one of the center bents, tank in outline, of balcony or walkway, rail, timbers under tank bottom, etc. The tank (16 x 16 ft. in size) should have 3-in. bottom, 3-in. staves, not over 6 in. wide, preferably of cypress or white pine, and wood or pipe balcony railing. It should have 13 hoops of graduated widths and spacings. On two

sides the grillage will have to be supplemented in order to make a walkway all around. This, in turn, may necessitate bracing to the posts; if so, the balcony should be braced or bracketed all around for the sake of appearance. No tank of this size and height should be put up without a walkway around it. (See *The Building Age*, issue of January, 1913, for article on erecting large wood tanks). For flat hooping, use iron 3/16 in. thick, with one hoop 4½ in. wide over the chime joint; four above it 4 in. wide and 11 in. apart; two above these 3¾ in. wide and 11 in. apart; two above these 2½ in. wide, one 11 in. up and the other 13 in. above it; two above these 3 in. wide, 13 and 14 in. apart; two above these 2½ in. wide, one 14 in. up and the other near the top. Paint the hoops and the outside of staves before the hoops are placed. Round hoops of same sectional area may be used. Half round iron, flat side to the staves, is better than round iron, as it does not cut as deeply into the wood.

All the timbers from top of posts up should be notched over bearings. A method of splicing and bolting posts together is shown at the right in Fig. 3. Bracing "*a*" crosses from post to post, and is bolted on, between stringers; "*b*" differs from "*a*" in crossing all



After the blocking is laid the spaces between the blocks are filled with hot tar, cementing the blocks into one continuous slab.

Answer.—As the size of the beams is not stated, we will assume the width of flange to be 3 in., making the clear span 2 ft. 9 in. The blocks on top undoubtedly add some strength, but it is impossible to get any idea of this without a test, because of the joints between the blocks, which will permit of considerable closing up when the floor deflects. The soft tar joints introduces another factor making it impossible to determine the effect of the blocks on the strength. Under the circumstances the only allowance we can make for the blocks will be the effect they have in distributing the load over a considerable area. That is, instead of a wheel causing a concentrated load in the center of a span it will be partially distributed. This increases the factor of safety.

All reliance for strength must be placed on the planking. To compute the strength of this, use the common beam formula for wooden beams

$$M = \frac{fbd^2}{6}$$

in which M = moment of resistance in inch-lbs.

b = breadth, which we will assume at 12 ins.

d = depth = 1.625 ins.

f = fibre stress, which we will take at 1200 lbs per sq. in.; then $M = 600 \times 12 \times 1.625^2 = 6730$ inch-pounds.

The bending moment is found as follows:

$$M = 1.2 \times L^2 \times w$$

in which M = bending moment in inch-pounds.

L = the clear span = 2.75 ft.

w = total load per sq. ft.

then $M = 1.2 \times 2.75^2 \times w = 9.1 \times w$.

Equating these two expressions

$$9.1w = 6730$$

$$w = \frac{6730}{9.1} = 748 \text{ lbs. per sq. ft.}$$

The weight of the construction will be practically 48 lbs. per sq. ft., so the live load will be 700 lbs. per sq. ft. uniformly distributed. If concentrated it will be one-half

$$\text{or } \frac{700 \times 2.75}{2} = 962.5 \text{ lbs.}$$

Let this represent the load on one wheel of a wagon and the total load will be $962.5 \times 4 = 3850$ lbs., which is to all intents and purposes a two-ton wagon loaded. This is about as close as any calculation will do in the matter of ascertaining the safe load on this floor. The breaking load will be about five times this.

ERNEST McCULLOUGH

Building on the Percentage Basis

From Builder, Clinton County, N. Y.—Regarding the question of "W. L.," Mineola, Texas, I would say that percentages are agreed on between builder and owner and are based on the gross cost of the structure, if all of it is erected; otherwise on the part that is built. Ten per cent is about the average charge, but varies from 5 per cent. to 20 per cent. according to the labor bill on the building.

Five per cent. is the architect's ordinary charge, and 5 per cent. for the work specified by "W. L." might be reasonable. If the building is pretty small it might not be enough, and *vice versa*.

From E. M. Birchler, Milwaukee, Wis.—In reply to "E. M.," Chicago, Ill., on page 428 of the September issue of *The Building Age*, I wish to state that he is of the wrong opinion if he thinks that the percentage basis is only "a present-day craze." If it would only be understood by more owners we would have

no other method of contracting, for it tends to bring on more honesty in building.

The contractor figures the cost of the material and labor and then he states his percentage, after which he agrees with the owner to receive a bonus of 50 per cent. of all he saves on the cost. Thereby the owner gets good work and material in the least possible time consistent with good workmanship. The bonus of 50 per cent. would be an incentive for the contractor to save time and rush the work.

The following example will illustrate:

Figured cost..	\$6,000
Contractor's % 15..	900
Total est. cost..	\$6,900
Saving, \$300.	
	\$6,000 cost
	300 saving
	\$5,700 actual cost
Contractor's 15%	855
	\$6,555
Contractor's bonus	150
	\$6,705 cost of house
	plus contractor's %
	and bonus.
Contractor's %..	\$ 855
Contractor's bonus..	150
	\$1,005
The owner saves	\$195.
The contractor gains	\$105.

Problem in Hand Railing.

From Morris Williams, Kingsbridge, N. Y.—I wish to assure "C. F. S.," Brooklyn, that my object in commenting in the August issue upon the diagram and explanation given by him in the June number in an attempt to answer the query of "A. E. K." was not to wantonly condemn his method of operation irrespective of other and far more important considerations.

His method is "strange" because it is fundamentally different from all other methods ever published which gives it an aspect of "perplexity" even to those who are well versed in stair lines and surely to the great majority who are not very far advanced. I cannot accept as satisfactory his explanation for the imperfections in his method of which I made a note in the August issue.

He says, "first of all I desired to make my diagram possess a symmetry of arrangement which is sometimes essential for purposes of instruction; also the lines were left out when it was thought that they would obscure the principal operation."

I maintain that because his desire was to instruct he should not allow a notion of "symmetry of arrangement" to hinder him from being instructive. The only way to instruct effectively in demonstrating a geometrical problem is to use all the lines that are required to make the solution understood by those for whom the solution is intended to be instructive. If he had followed such a mode of procedure his method would not appear so perplexing and possibly a "correct" face mold might have emerged as a final result of his strange manipulation of lines. As it appeared in his diagram it was not correct. The plain truth is that nothing else in his diagram is correct except the bevel, which accounts for my not mentioning it in my August comments, as seemingly from what he says I should have done.

The best that can be said even about the bevel is that it is correct in this example of equal pitch tangents. In my view it would have been better as a means of

instruction to use one of the prevailing methods that are universal in their application.

What "C. F. S." has to say about my diagrams in the August number is so immaterial and insignificant as to be of no value whatever to the controversy. He says "I find a contradiction between the measurements furnished by the given scale and those indicated in the diagrams."

What does it matter if there is? In view of the fact that all diagrams are made full size in actual construction diagrams used for instructions may or may not be worked to scale, the only requirement being that the arrangement of the lines shall be such as to give correct results.

He asks, "Why does the rail in Fig. 5 vary in height above the steps a distance more than 12 in.?" My answer is that it does not.

For the purpose of further helping "A. E. K." I present a few additional diagrams. By means of Fig. 1, which represents the falling mold of the center line of rail, according to "C. F. S.'s" method of operation, it will be seen that by lowering $1\frac{1}{2}$ in. from point 3 the rail will not follow the nosing of the winders as he thought it would (see his diagram in the June issue).

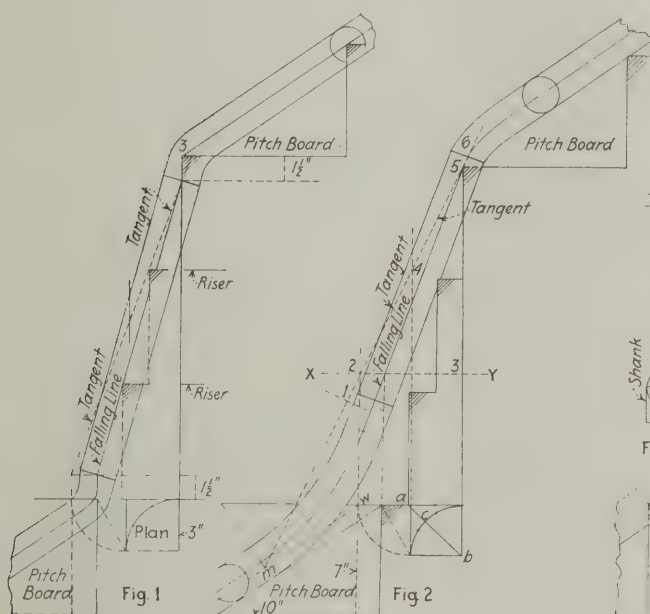


Fig. 1—Showing Form of Rail Produced by Method of "C. F. S."

Fig. 2—Form of Rail Produced by Method of Morris Williams

A Problem in Hand Railing—By Morris Williams

It will also be seen that it is an impossibility by his method to obtain any reasonable form of ramps at the top and bottom. A rail of this form besides being dangerous in ascending, and especially in descending, is an eye-sore in appearance.

By comparing it with Fig. 2, which represents the falling mold of my method as explained in the August issue, its defect will be more apparent. In Fig. 2 the ramps at the top and bottom are graceful and pleasing. The rail is kept above the winders as high as conditions allow, which is a feature that should never be overlooked in the construction of rails over and above small curves containing winders.

It will be observed that I have in both Figs. 1 and 2 drawn the pitch line of the tangents used by "C. F. S." and myself in previous diagrams, so that the relation of the pitch of the tangents to the falling mold may be clearly understood. The tangents are shown by dotted lines.

Although the best method with small curves is to raise the rail above the winders, as shown in Fig. 2, yet sometimes the stair builder is forced (and most often by an incompetent architect) to make the rail

follow the steps. To show how to accomplish such a construction, I present the three following simple figures. Fig. 3 represents the same plan as in the previous figures. The distance $a-b$ represents the unfolded tangents; the height $b-c$ that of the three winders, and the line $c-d-a$ that of the pitch and length of the tangents.

To develop these tangents upon the face mold proceed as shown in Fig. 4. Draw a right angle triangle, making the base $a-b$ equal to the diagonal $o-m$ of the plan, Fig. 3, and the height $b-c$ the same as $b-c$ in Fig. 3. Connect c with a , which represents the exact length of the face mold.

Now place in the compasses the length of the tangents $a-d$ or $d-c$ of Fig. 3; fix one point in a of Fig. 4 and turn around as shown by the arc. Fix it again in c and turn around to intersect the arc as shown at m and n . Connect m with n and upon it place point z the

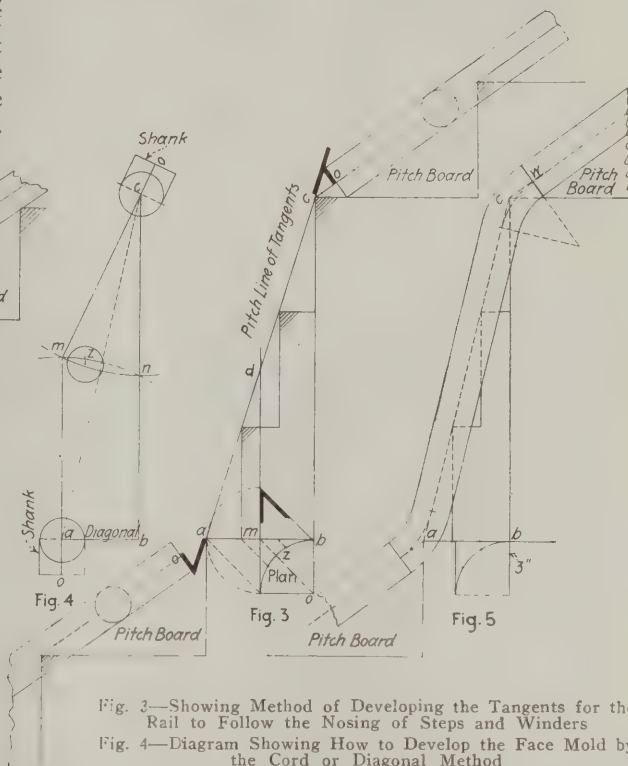


Fig. 3—Showing Method of Developing the Tangents for the Rail to Follow the Nosing of Steps and Winders

Fig. 4—Diagram Showing How to Develop the Face Mold by the Cord or Diagonal Method

Fig. 5—Diagram Showing the Rail Following the Steps and Winders Produced by the Method of Developing the Tangents as Shown in Figs. 3 and 4

same distance from m as z is from m in plan, Fig. 3.

Now draw the circle the diameter of which is equal to the width of the plain rail. Draw the circles shown at a and c $\frac{3}{16}$ in. wider. Take a lath and bend it to touch the three circles for the inside and outside curves.

Make the shank $a-o$ and $c-o$ equal the distance represented by the same letters in Fig. 3, thus completing the face mold.

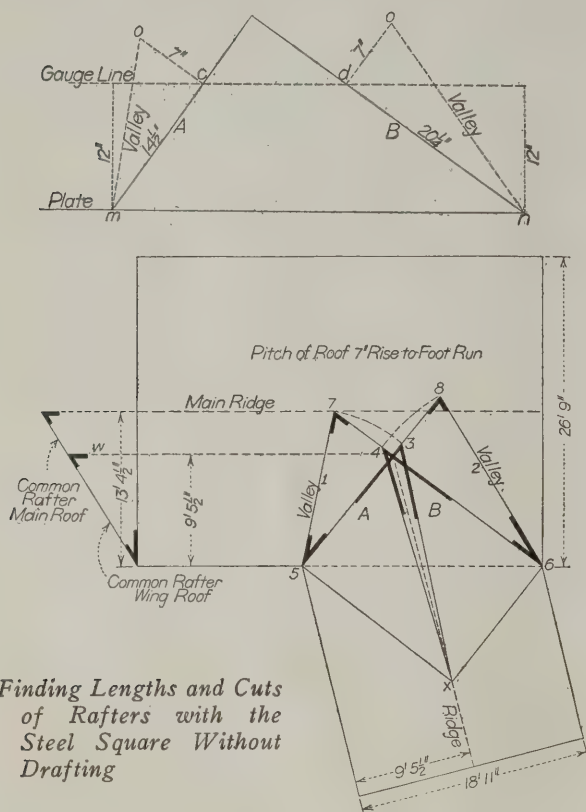
In Fig. 5 is shown the falling mold of the center line of this rail. It shows the rail following the steps and the ramps incomparably superior in point of pleasing appearance than what "C. F. S." presented in his diagram.

It will be observed that according to this method of operation the ramps are made in the wreath, not in the straight rail as in the other methods. The joints as shown at o and o in Fig. 4 are made square to the tangents, but not to the face of the plank.

The bevel shown at $c-o$ in Fig. 3 will have to be applied to the face of the plank, but when the wreath is squared and ramped the joint will be a "square butt" joint as shown at w in Fig. 5.

Finding Lengths and Cuts of Rafters with the Steel Square Without Drafting

From W. M. O., Kingsbridge, N. Y.—On page 234 of the May issue of the paper "W. S. B.," Colorado Springs, furnished a roof diagram with a request for



Finding Lengths and Cuts of Rafters with the Steel Square Without Drafting

some of the "sharps in roof framing" to tell him how to get the lengths and cuts of the two valleys A and B shown in his diagram; first, by making use of the steel square without drafting, and, second, by drafting.

To solve the problem with the steel square it is required first of all to find the run of each valley relative to the foot run of the common rafter. This may be accomplished by the method indicated in Fig. 1.

Place the steel square as shown upon a board to define the plan angle the valleys make with the plate. Gauge a line from the edge of the board at a distance of 12 in. to cut the plan valley A in the point c and the plan valley B in the point d. From c to m will measure the exact length of the run to use on the square for the valley A and from d to n the length of run for the valley B.

To find the length and cuts of valley A take 14 1/2 in.—the length of c-m on the blade—and 7 in. on the tongue; step along the timber nine times for the 9 ft. and add the 5 1/2 in the usual manner. This method gives the full length of the valley and also the cuts.

To find the length and cuts of valley B proceed in the same manner, taking 20 1/4 in. on the blade for the run and 7 in. on the tongue for the rise. Step along the timber nine times and add the 5 1/2 as for the valley A.

The nine times step and 5 1/2 additional inches represent the run of the wing roof which has a span of 18 ft. 11 in. and therefore a run of 9 ft. 5 1/2 in.

The cut to fit the valleys against the ridge is found by using upon the square for valley A the run 14 1/2 per foot of the valley per foot run on the common rafter on the tongue and the full length of the valley per foot shown in the diagram from m to o on the blade; marking along the blade for the cut.

For the valley B use 20 1/4 on the tongue and the full length of the valley per foot run shown from n to o on the blade, marking along the blade for the cut.

In the diagram, Fig. 2, is shown the method of finding the lengths and cuts by drafting. It will be observed that the lengths and cuts of the valleys are found by drawing each one upon its plan lines. The height is made equal to the height of the wing roof shown at w on the left-hand side of the diagram, where also is shown the length and cuts of the common rafters.

The bevels shown at 3 and 4 are thus required to fit the valleys against the ridge.

The point x is found upon the ridge by drawing the line from 5 and 6 square to the plan lines of the valleys.

Points 3 and 4 are shown to be found by revolving the valleys to the plan lines.

By drawing lines from 3 and 4 to x the cuts to fit the valleys against the ridge are found as shown at 3 and 4.

If the valley B extends to the cornice add to it the distance from the plate to the cornice.

What Readers Say of *The Building Age*

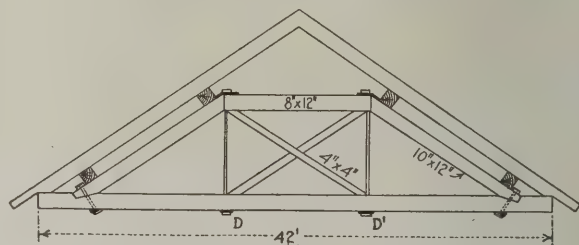
From C. W. M., Chelsea, Mich.—In renewing my subscription to *The Building Age* for another year I would say that this makes 30 years without a break during which I have been a subscriber to the paper. With the exception of about a dozen numbers, I have the volumes complete from No. 1, or the very first issue of the paper, then known as *Carpentry and Building*, and I hope to take it for many years yet to come.

I think it is one of the best, if not the best, of all the building magazines that I am taking, and I take quite a number. My wishes are for a prosperous year.

From W. W. M., St. Charles, Ill.—I have been a subscriber to the paper for a great many years and find it a great help to me, as well as exceedingly handy for constant reference. In my opinion it is the best paper of its kind in this country.

Roof Truss for a Wagon Shed.

From D. P. B., Redford, N. Y.—Regarding the inquiry of "C. C. H.," Brookville, Pa., I would say he gives no data to enable one to determine the load the truss must carry; whether it is to carry a floor, how big the shed is to be, or how many trusses he intends to put in. I am, however, sending a sketch of a truss that will carry 5 tons at "D" and the same at "D'." Slate will weigh about 9 lb. to the foot; snow 5 lb. to 20 lb., and wind 5 lb. to 40 lb. to the foot. If the tie



Roof Truss for Wagon Shed—Submitted by "D. P. B."

beam carries no load 5/8-in. rods will answer the purpose. The purlins for slate should be 6 x 10 in. and not more than 12 ft. long.

If there is to be a floor, the truss should be on the under side and of a different nature, provided the style drawn will be in the way of the floor space.

A building ordinance which has been passed by the Board of Supervisors and approved by the Mayor of Denver, Colo., renders it impossible to construct commercial buildings with the exception of drug stores in the residential district, and those already erected must have installed devices to prevent the spread of fire.

HEATING A SUBURBAN COTTAGE WITH FURNACE

Plans Show Position of Warm-Air Furnace, the Heating Stacks
and the Registers in the Various Rooms

THE season is at hand when the question of heating the house is all-important and builders are likely to be interested in methods of installation by which satisfactory results are achieved. Picturesquely situated in the suburb of Elmhurst, Ill., is the cottage which we have taken for the subject of this article, and which is heated by means of a hot-air furnace. Considering the house first in its structural aspect, notable features include the stucco and clapboard finish of the exterior walls; the pergola treated entrance at the front which is a slight modification of the original plans, the combination stairs leading to the second floor, and the artistic handling of the living room interior. The cottage is a seven-room affair with unusually large bathroom, commodious closets and the system of heating cannot fail to appeal to those desir-

floor joists 2 x 10 in. and the ceiling joists 2 x 6 in., all placed 16 in. on centers. The collar beams are 1 x 4 in. placed 32 in. on centers, and the rafters are 2 x 4 in. spaced 16 in. on centers. The wall studs are of 2 x 4 in. hemlock placed 16 in. on centers, and doubled at the corners. The studs have a double plate at the top and a single plate at the bottom. All headers over 6 ft. in length and not supported by posts or partitions are hung in wrought iron stirrups.

The roof joists are supported over bearing partition only. The roof boards on the shingle roofs are spaced 2 in. apart and the entire roof is covered with cedar shingles laid 4½ in. to the weather, the last course at the ridge being secured with galvanized iron ridge rolls.

The outside walls are covered with 1 x 6 in. dressed



Heating a Suburban Cottage with Furnace—Lyman J. Allison, Architect, Chicago, Ill.

ing a comfortable temperature within doors while the mercury hovers around the zero mark outside.

According to the specifications of the architect the footings are of concrete, as are also the basement walls, which to the grade line consist of a 1:3:5 mixture of Portland cement, crushed stone and Torpedo sand. The exterior surface of the walls is coated with a thick wash of Portland cement to fill the crevices and above grade, waterproof face cement blocks are used. The corners are rock face and the balance of tooth chisel design. In laying the blocks Medusa cement mortar was used. The entire basement and areas have a 3-in. cement floor.

The wall plates are 2 x 8 in., the bearing plate 6 x 8 in., supported on 6 x 6 in. posts, the first and second

and matched shiplap over which is spread two layers of No. 2 wool felt tar paper. Over this is mailed 1 x 2 in. strips running vertically and spaced 12 in. on centers to receive the metal lath to which is applied a coating of "Stone Kote" with rough cast finish.

The front porch has plastered columns and the rear porch 4 x 4 in. posts with 2 x 4 in. rail, 4 x 6 in. girder and 2 x 6 in. floor joists. The floor is of 4 in. yellow pine dressed on both sides and matched.

The floors of the rooms in the first story are double, the sub-floor consisting of 1 x 4 in. No. 2 yellow pine well nailed to each joist. The attic floor is made of 1 x 6 in. No. 2 yellow pine dressed and matched. The finish floor in the kitchen, bathroom and pantry is of 13/16 in. hard maple, and the balance is of selected No.

The plumbing fixtures include a 20 x 30 in. enameled iron sink in the kitchen, a two-part laundry tray in the basement, while in the bathroom is a 5 ft. 3 in. roll rim enameled iron bath tub supplied through a No. 4 nickel-plated bath cock. There is also an 18 x 24 in. enameled iron lavatory, the back, bowl and apron of which is in one piece on concealed brackets. The

same size is shown in the dining room and also in the kitchen. The position of the various stacks as they rise from floor to floor may be followed by means of the reference letters. In the front bedroom on the second floor are two 8 x 12 in. registers, while the three remaining bedrooms and bathroom are heated by means of 8 x 12 in. wafer registers, the location of each being clearly indicated.

The registers, which are of neat design and highly polished, are of the Tuttle & Bailey Mfg. Company make.

In the picture of the furnace on this page the stub with 20-in. opening shown on the foundation plan is directly beyond the hot water boiler seen in the illustration. The various small pipes connect with the water coil in the fire pot of the furnace. It may be interesting in this connection to state that the furnace is square in form and the fire box is made up of fire brick slabs resting on steel brackets. The No. 55 furnace used in heating this house contains 550 sq. in. of fire surface, has a radiating surface of 66.3 sq. ft., and being of steel has power to radiate much more rapidly than cast iron. The

power of the furnace, it may be stated, lies in the area of the fire surface and the area of the radiating surface.

The cottage here illustrated and described was erected for Joseph K. Mowers, at Elmhurst, Ill., in accordance with plans prepared by Lyman J. Allison, architect, 115 Dearborn Street, Chicago, Ill.

A model theatre has been built at Düsseldorf, in order to test the dangers of theatre fires, and the best



Heating a Suburban Cottage with a Furnace—View in One of the Sleeping Rooms

bathroom also has a syphon washdown low tank water closet with copper lined syphon tank of oak supported by nickel-plated brackets.

Outside the house where shown on the plan is a cistern built with concrete sides, top and bottom, and measuring 5 ft. by 5 ft. by 6 ft. deep.

The cottage here shown is heated by a No. 55 "Leader" hot-air furnace made by the Hess Warming and Ventilating Company, 1201 Tacoma Building, Chicago, Ill., the position of the heater being clearly indicated upon the foundation plan together with the points from which the various stacks rise to the rooms above. The furnace connects with the chimney by means of an 8 in. smoke pipe. Beside each stack is given its diameter in inches and also a reference letter in order to more readily follow its course to the floors above. The distance in the clear where the furnace stands is 7 ft. 6 in.

The foundation plan shows the position of the 20 in. air duct and in the living room directly above is shown the 16 x 30 in. cold air face register through which the cool air of the room is conducted back to the heater. In this way a complete circulating system is established by which the cool air at the floor of the rooms is drawn off to the furnace where it is heated and then returned. The process is continuous, automatic and entirely successful. It is not necessary in a dwelling of this kind that separate outlets for air be provided in each room as one large opening in the lower hall or living room is generally sufficient for the purpose.

On either side of the open fireplace in the living room is a 10 x 12 in. floor register and one of the



View of "Leader" Furnace in the Cellar, Showing Pipe Connections

means of rendering theatrical buildings proof against fire. It occupies a site measuring 50 ft. by 80 ft., with the auditorium 30 ft. and the proscenium 40 ft. high. The main part of the building is of steel and ferro-concrete. A special entry enables observations to be made both in the front and the rear, and two kinds of fireproof curtains will be fitted.

WARM-AIR FURNACE CAPACITIES AND PIPE SIZES

Importance of Furnacemen Being Able to Proportion the Several Parts in a Warm-Air Heating System—Some Rules from an Old Scrap Book

A FEW years ago when rules for determining furnace capacity and pipe sizes for heating rooms with warm air were fewer and less well understood than at the present time I began early to collect different rules and compare them with the results obtained in my practice, says a writer in a recent issue of the *Metal Worker*. At this season of the year many men are desirous of having something to refresh their memory as to what is the right thing to do in designing furnace heating systems, so I am giving something for their benefit from my scrap book.

Capacity of Furnace

The capacity of a furnace can be determined by calculating the open space through which the air can rise in passing through the furnace at the point where there is least opening. The area of this space in square inches will be the area of the warm air pipes which the air will fill and will be the area of the cold-air supply which should be used in connection with it. No more air can get into the furnace than can pass through this space and it is apparent that no more air can get out of it than the amount that gets in. While the expansion of the air by heating it is not overlooked it stands to reason that the space referred to must control the amount of expanded air passing into the warm air ducts. So far as the warm air is concerned it is possible that in many instances with furnaces of cheap construction, little fire travel and small heating surface, this open space will be larger than in better constructed furnaces, and consequently the area of the warm-air pipes which such furnaces will supply should be reduced 25 to 40 per cent.

To give some better guide to the beginner I would say that the capacity of a furnace of good construction having a deep fire-pot, a combustion chamber over it and above that a dome into which the smoke rises and then passes through an opening at one side or the other into a circular radiator around which it has to pass before it escapes to the chimney, may be reckoned in accordance with the accompanying table.

Table of Furnace Capacities

Diameter of fire-pot, in.	Diameter of casings, in.	Area of warm-air pipes, sq. in.
17	36	200
19	40	300
22	44	350
25	48	450
27	52	550
30	55	700
32	60	900
34	65	1012

If pipes are small and there are several of them, the furnace is more likely to fill them all full than if there are a few pipes and they are of large diameter. One large pipe directly over the top of the furnace, as it might be set in a church or other building, could be cut from one-half to one-third of the area given. The furnace should have a fire-pot of sufficient depth to carry a good body of fuel.

Furnaces constructed to expose a large amount of surface by different means and to give a longer fire travel will do their work more economically and with less forcing. Many men depend on the manufacturer's rating to get at the capacity of the furnaces and do not enter into any computations for themselves or make comparisons of the merits of different constructions to give different ratings to different furnaces of

the same diameter of casing or fire-pot. This is not the best way to become a thoroughly competent furnaceman.

Determining Warm-Air Pipe Sizes

There is just as much need of care in understanding the different rules for determining the right size for the warm-air pipe and in applying the rules to the conditions to be met. Some men compute the contents of the room to be heated and divide it by 25 or 30 for first-floor rooms and by 30 or 35 for second-floor rooms, regardless of its location, the length of the warm-air pipe, the furnace to the register or riser, or the exposure to the north, south, east or west as the case may be. The result is the area of the warm-air pipe to be used.

Many men do not realize that the amount of wall and glass surface exposed in a room exerts a more positive bearing on the needs than does the mere cubic contents alone. A room with two or three sides exposed will cool much more air and consequently require much more warm air brought into it than a room which has three sides enclosed by other rooms and but one side exposed to the outdoor atmosphere.

Rules Which Will be Found Useful

One rule which I have found in an old catalogue is to divide the contents of a room on the first floor having two sides exposed by 20, with one side exposed by 25; for second floor rooms with two sides exposed divide by 30, and with one side exposed, by 35; for the third floor, divide by 38, which will give the area of the warm-air pipe and the nearest size pipe to that actually required should be used, and if the room has a northern or western exposure, a larger size pipe should be used by all means. Some men add 10 per cent. for north and west rooms.

Another rule is to give 1 sq. ft. of pipe area for every square foot of glass; 1 sq. in. for every 10 sq. ft. of outside wall and 1 sq. in. for every 100 cu. ft. of space. For second-floor rooms pipes may have 20 per cent. less area and for third-floor rooms 30 per cent. less area. Those which are exposed to the north and west winds would have a 10 per cent. increase in area over those running to the south and east rooms.

When it is necessary to run the piping horizontally more than 15 ft. or there is occasion to make several elbows in it in order to reach the registers, the size of the pipe should be increased at least one size.

Summary of Massachusetts Laws of Interest to Builders

There has just been issued in pamphlet form a summary of the acts and resolves of the General Court of Massachusetts in 1913 of interest to contractors and builders, the matter having been prepared by William H. Sayward, the well-known secretary of the Master Builders' Association of Boston. The matter is presented in very comprehensive form and the pamphlet will be greatly appreciated by those for whom it is specially intended.

A coat of iron paint in linseed oil on the under part of flooring will add to the length of life of a wood floor by a year or two, perhaps more.

CONCRETE FOR PROTECTING DRINKING WATER

Making the Well Platform of Reinforced Concrete—Proportions of the Mixtures—Fixing Base of Pump to Finished Platform

BY PERCY H. WILSON

IT is a generally recognized fact that concrete well platforms are conducive to health in that they tend to protect the drinking water of a well. The principal source of farm water supply is either the bored or dug well, and the purity of the water is determined almost entirely by the ability of the well curbing and cover to keep out contaminating surface water. If the well is curbed near the top with solid concrete, or with blocks or bricks laid in Portland cement mor-

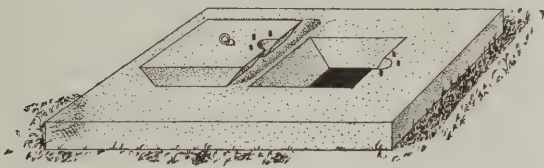


Fig. 1—Concrete Well Platform with Manhole Cover Removed

tar, and is covered with a concrete platform, the healthfulness of the water is practically assured.

There are several methods of building a concrete well platform. The choice is dependent on the manner in which the pump barrel and stock are joined together. In Fig. 1 of the illustration is shown a platform 5 inches thick and 5 feet square, which contains a manhole fitted with a concrete lid indicated just at the left of the opening. The pump stock passes through the platform by means of a circular hole at the side and a part of the manhole opening. By this means the pump stock and barrel can be joined together and slipped into position by a person working through the manhole. Afterwards the concrete manhole lid is set in place. Moreover, this lid is heavy enough so that it cannot be removed by a child. The platform with pump in place is shown in Fig. 2.

In preparing the well for a concrete foundation see that 4 or 5 feet of the curbing near the top of the well is of solid concrete (proportioned 1:2:4), or of blocks or bricks laid up with cement mortar mixed in the proportion of 1 part cement to 1½ parts sand. Carry the curbing 6 or 8 inches above natural ground level and grade the turf to this height so that surface water will flow away from the well. Prepare to mold the cover on a wooden platform of two-inch boards laid over the well or placed on a level spot of ground. For most wells, a platform 5 feet square by 4 inches thick is sufficiently strong. To provide for a manhole opening, build a bottomless box of 1 by 6-inch boards, 5 inches deep, 2 feet square at the top and 18 inches square at the bottom—outside measurements. Another plan is to have a tinsmith make a round bottomless tin form 5 inches deep, 2 feet in diameter at the top and 18 inches at the bottom, after the pattern of a large bottomless dish-pan. To either manhole form attach a wooden block of the size and shape of the pump barrel or stock. Grease the manhole frame and

set it on the wooden platform where the opening in the well cover is desired.

Proportion the concrete 1 bag of Portland cement to 2 cubic feet of sand and 4 cubic feet of crushed rock, or 1 bag of cement to 4 cubic feet of pit gravel. Have the concrete just wet enough to flush a little cement mortar when tamped into place. Over the entire wooden platform, except within the manhole frame, spread 1 inch of concrete. For reinforcing, immediately place on this concrete 5-foot lengths of ¾-inch iron rods running in both directions (criss-cross) and spaced 9 inches apart. Bend the ends to a hook-shape. Strengthen the platform around the manhole opening by placing an additional rod on each side. Bring the cover to its full thickness at once by tamping in the remaining four inches of concrete. There will be needed 3 bags of cement, 1/5 cubic yard of sand, 2/5 cubic yard of rock and 6 pieces of ¾-inch by 10-foot rods weighing 23 pounds.

For fixing the base of an iron pump securely to the finished well platform, place in the soft concrete around the pump opening ordinary bolts (washer and heads down) to the depth of 4 inches. To locate these bolts correctly, set them by means of a wooden block or templet in which holes have been bored and spaced exactly like those in the pump base. Lag bolts or similar devices may also be used for this purpose. Finish the surface of the platform with a wooden float and steel trowel the same as for sidewalks. If the greased tin form is used, the manhole cover may be cast at the same time as the rest of the floor. Reinforce the lid with short lengths of iron rods laid criss-cross. As a lifting ring

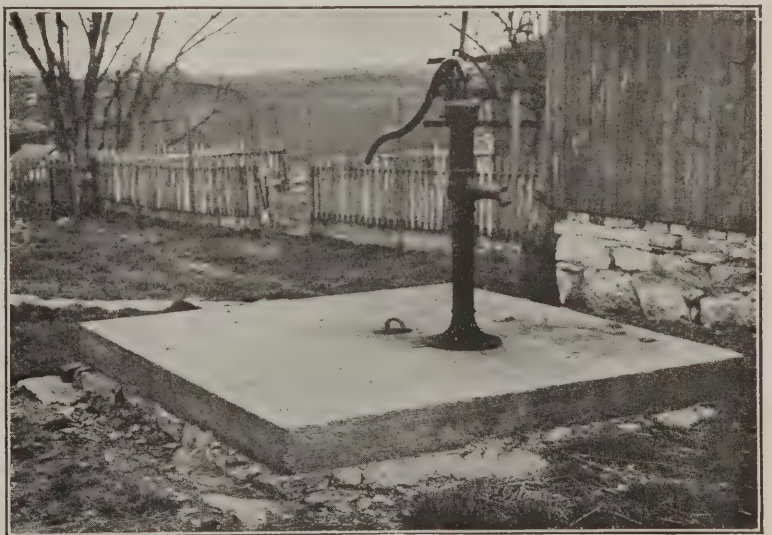


Fig. 2—Sanitary Well Platform of Concrete

use half of an old bridle bit, or a hitching-post ring, the end of which is provided with a knob of twisted wire or with a nut and a large washer. If the wooden manhole form is used, carefully remove it after four hours. One day later build the manhole lid the same as for the tin form with this exception—place greased paper or card-board around the edges of the opening to prevent the new concrete from sticking to that of

the platform. To make the manhole lid lighter in weight, before placing the concrete, spread $1\frac{1}{2}$ inches of wet sand over the wooden platform inside the manhole opening and then tamp in the concrete. Take care to place the reinforcing within one inch of the bottom of the manhole lid.

After the well platform is two weeks old, carefully remove the wooden boards on which it was built and set or lower it into place. Give the platform a slope of $\frac{1}{2}$ inch by placing a layer of cement-sand mortar between the well curbing and the platform.

Some persons prefer to make concrete well platforms in two pieces with the division line through the center of the pump opening. By this means the pump barrel and stock are easily joined and inspection is readily provided for. In other cases where the pump and stock can be joined together and lowered into the well as one piece, the concrete platform (removable) is made as a unit and with a single opening merely large enough to receive the pump stock.

Concrete well platforms built according to these methods can be depended on to protect the well from mice, vermin and scrubwater.

Responsibility of Contractor in Completion of Contracts "on Time."

Considerable discussion has lately ensued among the members of the building fraternity concerning the question of responsibility of the contractor in the matter of "time limit" in the completion of contracts, etc. A most important contribution to this discussion is found in the last Monthly Letter sent out by Secretary William H. Sayward of the Master Builders' Association of Boston. He states that one of the members of the Association brought up the matter in connection with the following clause in the specifications of a house upon which he was estimating:

"The owner shall not be liable to the contractor for the neglect, default or delay of any other contractor employed on the work, nor shall such neglect, default or delay release the contractor from the obligation to finish his work."

In commenting upon the subject Mr. Sayward said: "I subsequently received a letter from this member making some interesting comments on the general question of the contractor's relation to delayed work. Among other things he says, 'Nowadays it has become the fashion for a general contractor to be held responsible for the completion of work "on time"—often a forfeit clause is used as a whip. . . . A general contractor has several sub-contractors under him and these are sometimes chosen by the architect and sometimes subject to the architect's approval. There are delays of all sorts which may occur and which are entirely beyond all control or cure by the general contractor. The delay caused by a rush of business of some one sub-contractor may occur—and the sub-contractor may be such a man as any one would be justified in assuming capable of completion in time. The delay in freights is never within control of the contractor. A few architects are notorious for moderation in sending out details—and often the contractor is on this account driven to place his work with regard to time only—to the detriment of his pocketbook. Architects who are slow try to figure out how the contractor has time enough, and rarely allow a reasonable period for getting out working drawings and for getting careful estimates—all of which are often needed before orders may be placed.

"Time of completion is a very serious matter, and it is my opinion that the contractor should be allowed to submit for the architect's ruling, as occasion arises, causes of delays which are clearly beyond his reasonable control or anticipation. Extension of time should be granted in such instances."

"I may say here that the architects responsible for the clause quoted state that two additional clauses in the contract to be signed by the successful bidder would protect the contractor 'under any reasonable cause.' The clauses are as follows:

"Clause in Contract (9th): 'The contractors herein named agree to co-operate with and afford to such and all other separate contractors on this job every reasonable facility for doing and completing their works as the work under this contract progresses; and if they do afford such facilities, neglect on the part of said separate contractors to complete their works shall not in any way give rise to a claim against the contractors herein named for non-completion hereof at the date hereinbefore specified.'

"Strike Clause (in contract): 'For any delay caused by a strike or lockout among the workmen in the Building Trades, additional time (equivalent to said delay) shall be allowed for the completion of this contract, provided that written notice be given within five (5) days' time of such delay.'

"To my mind there is a conflict of authority between the 'Specification Clause' and the 'Ninth Clause of Contract.' It does not appear clear which of these clauses is to rule and whether the contractor is to be held liable for delay caused by other contractors or not. There seems to be considerable ambiguity in the wording, and at all events, any conflict between the clauses should be avoided. A contractor should know in advance whether the contract he will be called upon to sign if he be the successful bidder will reverse the provisions of a clause in the specifications.

"My correspondent brings up still another aspect of this 'specification clause.' Referring, evidently, to the words, 'The owner shall not be liable to the contractor for the neglect, default, or delay of any other contractor employed thereon,' he says, 'The specification clause, to which these remarks are a criticism, allows architect, owner, or any other contractor upon the work to protract the work indefinitely without possibility of redress upon the part of the general contractor,' and he further comments that 'delays may be expensive to the contractor—and while he may be expected to bear the burden for work within his contract, it certainly seems wrong to ask him to assume such expense when it arises from work let outside of his contract, upon which he makes no profit and for which he is in no way responsible.'

"While the clause permits delay by other contractors without redress to the contractor from the owner, I think our member has been a little too broad in assuming that it relieves the owner from liability to the contractor due to the *owner's or architect's fault*, as a careful reading of the clause shows that it simply relieves him from liability due to delay of *other contractors*. That the contractor should bear the expense of delays of other contractors employed directly by the owner is an unwarranted burden and deserves a remedy.

"Whether the recourse of the builder for delays due to his sub-contractors should be to the *owner*, when the owner has selected such sub-contractors, appears to be theoretically open to question. But in practice it may well be that the owner, through his agent the architect, might often help to prevent delays by other contractors, and it should be his duty so to act."

The Gargoyles of Notre Dame

"Perhaps few cathedrals, at home or abroad, possess on their exterior so many curious grotesques as does Notre Dame, and scarcely any visitor to Paris leaves that fair city without being more or less impressed by them. Probably the majority, if they give a thought at all upon the subject, put these down as part and parcel of the original fabric, which dates from 1163. But such is not really the case," says Harry Hems in *The Guardian*. "The majority are comparatively modern and, curiously enough, were not carved by French craftsmen at all, but by an Englishman named Frampton, a clever artificer who has long since gone to his rest."

WAGES IN BUILDING TRADES IN ENGLAND

Figures Covering Leading Cities in England and Wales and Affording Comparison with Building Wages in America

IN the last issue we presented to the attention of the readers a table showing the rates of wages paid mechanics in various branches of the building trades in many of the leading cities of the United States and upon this page we give the rates of wages in the building trades in the principal towns of England and Wales. By comparing these figures with those presented in our last issue the difference in wages paid in similar lines in the two countries is readily apparent.

The table here shown is taken from the *London Builder* of August 1, 1913, which states that while every

ditions for the little folks from the entire public. This should encourage business men who are specialists in these features of schoolhouse equipment which bear most directly on the hygienic conditions to enlist in a movement for their betterment wherever it is needed. There is no one so well qualified as these specialists to make the investigations or who can do it so quickly and so conclusively and who then can so readily make a clear presentation of the case to the local newspapers which will inform the parent and the children's friends of the conditions found. The advancement in health

Table of Wages in the Building Trades of England and Wales

Name of Place	Masons	Brick-layers	Car-penters, Joiners	Plas-terers	Slaters	Plumbers	Painters	Masons' Laborers	Brick-layers' Laborers	Plas-terers' Laborers
Newcastle.....	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Sunderland.....	10	10	10	10	9½	9	9	6½	6½	6½
Darlington.....	9½	10	9½	9½	9½	9	9	6½	6½	6½
Stockton-on-Tees.....	9	10	9½	10	9½	8	7½	6½	6½	6½
Bradford.....	9½	9½	9	9	9½	9	8½	6½	6½	7
Halifax.....	9	9	8½	8½	8½	8½	8½	6½	6½	6½
Hull.....	9½	9½	9½	9½	9½	9½	8½	6½	6½	6½
Leeds.....	10	10	9½	9½	9	9½	8	7	7	7
Sheffield.....	9½	9½	9½	9½	9	9½	8	6	6	6
York.....	9	9½	8½	9½	9½	8½	7½	6½	6½	6½
London.....	11½	11	11½	11½	11	11	8 upwards	7½	7½	7½
Brighton.....	8-9	8	8	8	8	8	8	6½	6½	6½
Portsmouth.....	9	9	9	9	9	9	7½	6½	6½	6½
Southampton.....	8	9½	8½	8	8	8	7½	6½	6½	6½
Maidstone.....	8½	8½	8½	8½	8½	8½	7½	6½	6½	6½
Bristol.....	9½	9½	9½	9½	9½	9½	7½	5½	5½	5½
Plymouth.....	8½	8½	8½	8½	8½	8½	7½	5½	5½	5½
Bath.....	7½	7½	8	8	7½	7½	7	5-5½	5-5½	5-5½
Cheltenham.....	8½	8½	8½	8½	8½	8½	7½	5	5	5
Exeter.....	8	8	7½	7½	7½	7½	6½	5	5	5
Gloucester.....	7½	8½	8½	7½	7½	8½	7½	5	5	5
Hereford.....	7½	7½	7	8	7½	7	6½	4½	4½	4½
Stroud.....	7	7	7	7	7	7	6½	4½	4½	4½
Blackburn.....	9½	9	9½	9	9	9½	9½	6½	6½	7
Bolton.....	9½	10	10	10½	9	9	9	6½	6½	6½
Liverpool.....	10½	10½	10½	10	10	10	9½	6-6½	6-6½	6½
Manchester.....	10	10½	10	10½	9	10	9½	6	6	7
Oldham.....	10	10½	10	9½	8½	9½	9½	6	6	7
Preston.....	9½	10	9½	9	8½	9	8½	5½	6	6
Birmingham.....	10	10	10	10½	9	10½	9	7	7	7
Derby.....	9	9	9	9	9	9	8	6	6	6½
Leicester.....	9½	9½	9½	10½	9	9	8	7	7	7½
Nottingham.....	10	9½	9½	10	9	9½	9	7	7	7
Norwich.....	8	8	8	8	8	8	6½	5	5	5
Cambridge.....	9	8½	8½	9	8	9	7	5½	5½	5½
Oxford.....	8½	8	8	8½	8	8½	7	5½	5½	5½
Southend.....	9	9	9	9	Piecework	9	7	6	6	6
St. Albans.....	8½	8½	8½	10	8½	8½	7½	6	5½	6
Grays.....	10	10	10	10	8½	8½	7	6	5½	7
Cardiff.....	9½	9½	9½	9½	9½	9½	8½	6½	6½	6½
Swansea.....	9	8½	9	9	8½	8½	8½	6	6	6
Newport.....	9	9	9	9	8½	8½	8½	6	6	6
Chatham.....	8	9	8½	9	9	8½	7	5½	5½	5½
Birkenhead.....	10	10	10	10	10	10	9½	6½	6½	6½

The mason's rate is given for bankers; fixers usually ½d. per hour extra.

endeavor has been made to insure accuracy it cannot be responsible for errors that may occur.

Our readers can readily convert the rates of wages paid abroad by considering an English pence the equivalent of two cents in American money.

School Sanitation

The importance of maintaining proper hygienic conditions in schools where growing children are affected disadvantageously by insufficient warmth, impure air and faulty sewage disposal becomes more prominent as the more severe weather of winter sets in and schools are closed tight to avoid cold. It is certainly the duty of all parents to begin action on city officials wherever schoolhouse construction and equipment places their children at a disadvantage, and they may rest assured of the support in their efforts for betterment of con-

protection, of which every citizen is so proud in whatever section may be his home, is not a proper advance unless it includes changes which will bring the conditions in all school buildings up to the highest standards. Now is the time when a little leisure is coming to the specialist, and it should be devoted to making that investigation which is practically without expense to the investigator of the conditions as to ventilation that obtain in schools and all public buildings and then make the report and secure that publicity for it which will make it of greatest importance to the community.

The supply of wood suitable for pencil stock is said to be so reduced in Tennessee the pencil factories buy logs from old cedar barns and fence rails, in some cases paying as high as ten cents a rail in addition to putting up a new wire fence. The average stumpage value of cedar of saw-log size is \$20.

A BRIEF REVIEW OF THE BUILDING SITUATION

Figures Showing Building Activities in Leading Centers Based on the Value of Permits Issued in August, 1913, and August, 1912



REPORTS which reach us from leading centers of the country covering building operations in August indicate a continuance of the growing conservatism on the part of builders, noted in recent issues, and which is fairly in consonance with conditions prevailing in many other lines of industry. The general tendency seems to be toward a lessening of activity due in many cases perhaps to special causes, although it is expected that the totals for the year will make a fair comparison with those of 1912. In some sections labor difficulties have been responsible for a portion of the nearly 20% decrease as compared

with last year, while in other sections building in the past has been upon such a scale that it is not surprising the present season should show some slowing up in this line.

In the northeastern section of the country, Philadelphia shows an increase of 7 per cent and Boston just keeps abreast of the figures of August, 1912. New York records a decrease of 54 per cent, for a large portion of which the "office building" column is responsible, there having been no permits issued in the Borough of Manhattan for this class of structure during August, 1913, as against a total of \$5,805,000 in August, 1912. In the same city, a decrease of about \$1,000,000 is to be noted in the "tenement" column and, under the head of "public buildings and places of amusement," permits totaling a value of only \$12,000 are recorded. On the other hand, Newark, N. J., reports an increase of 101 per cent, due to special causes; Troy, of 152 per cent; Albany, 59 per cent; Harrisburg, Pa., 23 per cent, and Hartford, Conn., 7 per cent, while Rochester, N. Y., loses 21 per cent; Buffalo, 24; Baltimore, 3, and Washington, D. C., 31. In the case of the Capitol city, the decrease is not surprising, in view of the extraordinary activity in residence construction which has been taking place in that city during the past year.

NORTHEASTERN CITIES

Cities	1913		1912	
	No. of Bldgs.	Estimated Cost	No. of Bldgs.	Estimated Cost
New York	1,181	\$7,634,150	1,228	\$16,511,745
Boston	340	5,913,000	449	5,938,000
Philadelphia	1,129	3,696,860	1,309	3,445,935
Newark, N. J.	209	1,814,638	242	901,069
Rochester, N. Y.	304	791,643	409	1,005,329
Buffalo	383	682,000	458	900,000
Baltimore	245	674,887	228	694,304
Washington, D. C.	369	627,472	456	912,766
Albany	367	577,180	257	362,400
Hartford	94	554,425	102	514,930
Springfield, Mass.	95	274,495	127	438,610
Worcester, Mass.	120	241,993	171	587,858
Troy	45	141,780	42	56,215
Portland, Me.	30	104,750	42	190,595
Harrisburg, Pa.	27	95,565	30	77,725
Scranton, Pa.	47	63,629	60	185,810
Paterson, N. J.	47	49,730	77	136,303

The cities of the southeastern section of the country make a rather poor showing with the exception of Tampa, Fla., which records an increase of 548 per cent over the figures of August, 1912. Atlanta loses 27 per cent; Richmond, Va., 44; Norfolk, Va., 72; Jacksonville, Fla., 29.

SOUTHEASTERN CITIES

Cities	1913		1912	
	No. of Bldgs.	Estimated Cost	No. of Bldgs.	Estimated Cost
Atlanta	297	\$348,256	332	\$478,159
Tampa, Fla.	155	246,768	84	38,092
Richmond, Va.	44	231,635	119	413,935
Norfolk, Va.	50	130,628	80	492,276
Jacksonville, Fla.	53	95,625	82	137,990

Of the cities of the north-central portion of the country, Cleveland, Ohio, has 92 per cent increase over the figures of August, 1912. Minneapolis gains 15 per cent; St. Paul, 25; Omaha, 13; Columbus, Ohio, 27, and Toledo, 6 per cent, over the figures of the corresponding month of last year. Chicago lost 21 per cent and St. Louis makes a still worse showing, with a loss of 35 per cent. Kansas City, Mo., loses 16; Indianapolis, 21; Akron, Ohio, 36.

The extremely poor showing of Cincinnati, with a loss

of 69 per cent, is due largely to labor troubles, the teamsters strike in that city having tied up an immense volume of building operations. Reports indicate, however, that conditions in that city have assumed almost normal proportions, and that a resumption of activity may be looked for in the near future.

Of the smaller cities of the north-central portion of the country, Cedar Rapids, Iowa, gained 39 per cent; Grand Rapids, Mich., 10 per cent, and Peoria, Ill., 74 per cent, while losses of 40 per cent are recorded for Youngstown, Ohio; 34 per cent for Fort Wayne, Ind.; 9 per cent for Evansville, Ind., and 23 per cent for Duluth, Minn. Davenport, Iowa, makes a good showing, with an increase of 80 per cent, and South Bend, Ind., of 70. Lincoln, Neb., loses 40 per cent; Springfield, Ill., 51; St. Joseph, Mo., 67, and Topeka, Kan., 47 per cent.

NORTH CENTRAL STATES

Cities	1913		1912	
	No. of Bldgs.	Estimated Cost	No. of Bldgs.	Estimated Cost
Chicago	971	\$5,754,900	963	\$7,184,396
Cleveland	1,013	4,041,970	833	2,102,063
Minneapolis	565	1,211,230	551	1,050,815
St. Louis	759	1,082,947	731	1,671,951
Kansas City, Mo.	315	827,475	404	1,016,150
St. Paul	305	775,146	343	618,774
Indianapolis	489	700,768	500	888,670
Omaha	97	536,515	133	474,137
Cincinnati	1,053	504,130	1,087	1,618,385
Columbus	239	495,140	222	389,830
Toledo	199	357,830	199	334,985
Akron	250	354,125	275	554,465
Cedar Rapids, Iowa.	47	250,000	33	180,000
Youngstown, Ohio.	109	227,725	103	384,400
Grand Rapids, Mich.	142	220,701	150	200,514
Fort Wayne, Ind.	256	174,175	86	264,805
Evansville, Ind.	97	171,375	123	188,620
Peoria, Ill.	42	161,510	28	92,580
Duluth	151	158,960	126	207,788
Davenport, Iowa.	29	119,235	20	66,200
South Bend, Ind.	34	113,472	46	66,390
Lincoln, Neb.	33	75,115	46	125,500
Springfield, Ill.	32	70,025	63	143,225
Terre Haute, Ind.	47	64,686	43	57,077
Topeka	39	45,225	51	85,362
St. Joseph, Mo.	58	42,970	118	132,848

Most cities of the south-central section record losses, there being only two exceeding the figures of last year—Birmingham, Ala., with an increase of 2 per cent, and New Orleans, with an increase of 3 per cent. Memphis, Tenn., is a heavy loser, with a decrease of 71 per cent. Louisville, which heads the list of the south-central cities, loses 41 per cent, as compared with August, 1912; Dallas, Texas, 34; San Antonio, 32; while Chattanooga and Nashville show losses of 8 and 31 per cent, respectively.

A general decrease in building operations in the state of Texas is reported by the Texas Commercial Secretaries and Business Men's Association. Dallas led all other cities of the state, and Waco and San Antonio followed, in the order mentioned. El Paso and Beaumont are the only cities in Texas whose building permits in August, 1913, were greater than in August of last year. All other cities show heavy decreases.

SOUTH CENTRAL CITIES

Cities	1913		1912	
	No. of Bldgs.	Estimated Cost	No. of Bldgs.	Estimated Cost
Louisville .....	....	\$3,101,700	....	\$5,296,240
Dallas	179	405,300	169	623,098
Birmingham	301	333,385	254	325,761
Memphis	247	321,116	362	1,101,595
New Orleans .....	....	295,260	....	284,636
San Antonio, Texas.	254	225,385	205	334,515
Chattanooga	199	125,435	210	136,210
Nashville	34	101,224	41	146,660

The cities of the Pacific coast make an irregular showing, the most notable increase being Sacramento, which records a gain of 125 per cent over the figures of August, 1912. Portland, Ore., leads the list in volume of building operations for which permits were issued during the month, with an increase of 7 per cent. Seattle shows an increase of 3 per cent, the credit for the increase of the latter city being due largely to the activity in the construction of churches, municipal buildings, theatres, etc. The building of detached residences shows a healthy increase in the latter city, however, over the figures of last year, but there is a very decided decrease in the value of

improvements under the head of warehouse and factory buildings. Tacoma, Wash., makes a very much better showing than Seattle, with an increase of 70 per cent over the figures of the corresponding month of last year. Spokane, Wash., breaks even, the difference in the figures for the months of August, 1912 and 1913, being less than \$500. Colorado Springs loses 39 per cent, as compared with the figures of August, 1912.

PACIFIC COAST CITIES

Cities	1913		1912	
	No. of Bldgs.	Estimated Cost	No. of Bldgs.	Estimated Cost
Portland, Ore.	626	\$1,168,245	934	\$1,094,509
Seattle	977	582,425	1,005	563,435
Sacramento	87	260,405	60	115,391
Tacoma	188	152,737	151	89,527
Spokane, Wash.	78	110,929	85	110,457

PACIFIC COAST CITIES—(Continued)

Stockton, Cal.	37	63,976	26	151,690
Los Angeles	1,293	3,501,593	1,571	3,212,007
San Francisco	512	1,613,881	613	1,950,502
Oakland	322	1,265,053	410	1,267,779
San Diego	252	716,481	752	861,368
Berkeley	89	127,750	86	157,150
San Jose, Cal.	40	39,160	30	122,395

Los Angeles has an increase of 9 per cent over the figures of August, 1912, this increase being especially notable in view of the fact that the other cities of the Pacific Coast, including San Francisco, show marked decreases. San Francisco loses 17 per cent, as does also San Diego.

Salt Lake City make a very poor showing, with a decrease of 71 per cent, while Berkeley and San Jose, Cal., each record losses of 18 per cent over the figures of the corresponding month of 1912.

BUILDERS' APPLIANCES AND EQUIPMENT

Some Things of Seasonable Interest to Those Having
to Do with the Building Business

The Combination Level

A tool which will be found very convenient for carpenters, tile setters or cement workers and which is especially adapted to jobbing work is the device illustrated in general view in Fig. 1, and which is made by the Combina-

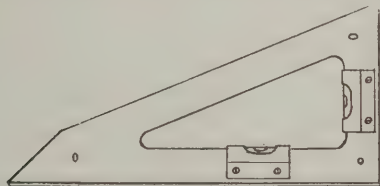


Fig. 1—General View of the Combination Level

tion Level Company, Pittsburgh, Pa. The tool combines level and plumb with miter, octagon and square. It can be used separately for short work for it may be quickly attached to a straight edge for setting frames, partitions or doing any kind of plumbing or leveling. It is referred to as compact, accurate and light in weight and is of such a size as to occupy little space in the carpenter's kit of tools.

Use of the Starrett Transit

The L. S. Starrett Company, Athol, Mass., tool makers, has just published a 32-page instruction book the title of which is "The Use of the Starrett Transit." This book will be found of great value by contractors, builders, and others who must do their own grading, leveling, and general simple engineering work. Such problems as finding differences of level of two places, measuring vertical angles, laying out building lots or foundations, finding irregular areas, measuring across water, etc., are dealt with in a simple, thorough manner so that by the aid of this book any man may avail himself of the low-priced Starrett Transit or Level to advantage.

A copy of the book will be mailed free to anyone on request and is also sent with each Transit sold.

The R-W Carpenters' Hinge Gauge

A tool which cannot fail to be appreciated by every carpenter to whose attention it is brought is the hinge gauge which has just been placed upon the market by the Richards-Wilcox Mfg. Company, Aurora, Ill., and illustrated herewith. The device is made in three pieces from solid oak, each piece being 29½ in. long. The metal parts are furnished in either brass or electro-galvanized gray iron. In Fig. 2 is shown a general view of the hinge gauge which is finding favor with mechanics wherever it is introduced. The claim is made that the gauge is easily adjusted to fit the smallest as well as the largest hinges and is equally adapted for use on the smallest as well as

the largest doors. In using the device when fitting a door the latter is placed on edge on the floor and the hinge gauge is arranged on it with the end-plate against the top edge of the door. The gauge points are then adjusted to the place where the mortise is required and so that the hinge fits tightly between them. The door is then marked between the gauge points, after which the hinge gauge is placed on the door frame so that the end-plate fits snugly against the head of the jamb and then the carpenter marks between the gauge points as illustrated in Fig. 3.

The end-plate is of proper thickness to allow for top clearance of the door. It also brings the marks on the door and side jamb perfectly in line and all liability of error in cutting mortises as in the old way is avoided. In addition all hinges are of uniform distance from top and bottom of door as well as door frame and if so desired the doors may be interchanged. The hinge gauge is also a convenient tool for correctly locating lock mortises; for hanging blinds, casement windows, screen doors, etc., and it can be used as a tram-rod for laying out all kinds of circular work, such as centers for brick



Fig. 2—View of the Tool

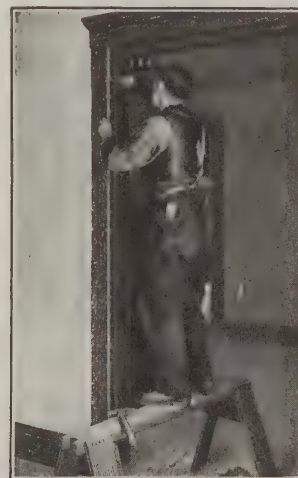


Fig. 3—Showing One of the Applications of the Hinge Gauge

The "R-W" Carpenters' Hinge Gauge

work or any purposes where circles or segments must be laid out with great accuracy. Another useful purpose is for accurately transferring several marks from one piece to others. Carpenters and builders who have practically demonstrated the merits of the hinge gauge refer to it in

most flattering terms. The company makes the announcement that it will be pleased to send one of these devices to any carpenter or contractor for ten days' free trial.

Some Applications of Plastergon Wall Board

In our last issue we directed attention to the more important merits of Plastergon Wall Board as turned out by the Plastergon Wall Board Company, Tonawanda, N. Y., and upon this page we show three of the many



Some Applications of Plastergon Wall Board—Fig. 4—Showing Treatment of an Attic

uses to which this wall covering may be advantageously applied. As has heretofore been stated the wall board is designated as "an improvement—not a substitute—on lath and plaster," consisting as it does of selected spruce wood fiber, the pulp being impregnated by a patented process which it is claimed protects it from the action of the weather and renders it practically moisture proof. This process gives a product of such a nature as to enable the company to guarantee every panel. The seasoning process is very thorough and not content with efficient artificial seasoning the board is allowed to remain in warehouses from 15 to 20 days for further seasoning before shipping. Every panel is inspected before it goes out and when used in accordance with instructions enclosed in each bundle it is guaranteed to give entire satisfaction.

The company points out that Plastergon adapts itself to all styles of architecture and by means of it a most



Fig. 5—Board Used on Walls and Ceilings of a Commercial Office

harmoniously artistic finish for the entire house may be accomplished at a minimum cost. One of the many uses to which it may readily be applied is that of finishing the attic of a house in such a way as to produce a most attractive result as may be seen from an inspection of Fig. 4 of the accompanying illustrations. Here, the walls and ceiling together with the slope of the roof have been covered with panels of Plastergon in a most satisfactory manner. Another application of the wall board is seen in Fig. 5 of the engravings which represents the interior of a business house wherein the ceiling is paneled most effectively. It is also especially serviceable in the construction of booths for exhibition purposes, and in Fig. 6 we show a booth which was built at the Pure Food Show

in Buffalo. The material also makes an ideal interior for hotels, clubs, restaurants, stores, garages, offices, etc., because of its low cost, easy and convenient application and adaptability to large surfaces.

The board is easily applied in new construction by nailing the panels directly to the studding or joists with $1\frac{1}{8}$ in. flat head nails. It can also be applied to old walls or ceilings without the necessity of removing the lath or plaster and where such use is made of the board 2 in. nails are required in order to give the best results. It is made in a great variety of sizes, thus permitting of an extensive assortment of panel designs to be produced, fitting any style of architecture. The sizes most commonly used are 32 and 48 in. wide by 4, $5\frac{1}{2}$, 6, 7 and 8 ft. in length. Stock sizes carried by the factory for immediate shipment are 24, 32, 36 and 48 in. wide and in any length from 1 ft. up to and including 10 ft. The decorative strips used are $1\frac{3}{8}$, $1\frac{1}{2}$ and 2 in. wide.

After Plastergon is applied it may be painted with either oil or water colors, depending on conditions. The oil finish gives a waterproof and sanitary surface which it is said can be washed and kept clean with little effort, while the water colors make an inexpensive yet satisfactory surface, but is not waterproof. This finish is extensively used in attics, bedrooms, bungalows, etc., where a waterproof finish is unnecessary. Walls are treated in wainscot and frieze designs, while ceilings may be beamed or plain, arched or flat.

The material is referred to as a non-conductor of heat and cold, thus making a house warmer in winter and cooler in summer; it does not check, chip, crack and fall off; is not affected by strains, shocks and vibration that often ruin plastered walls and ceilings; is fire retarding,

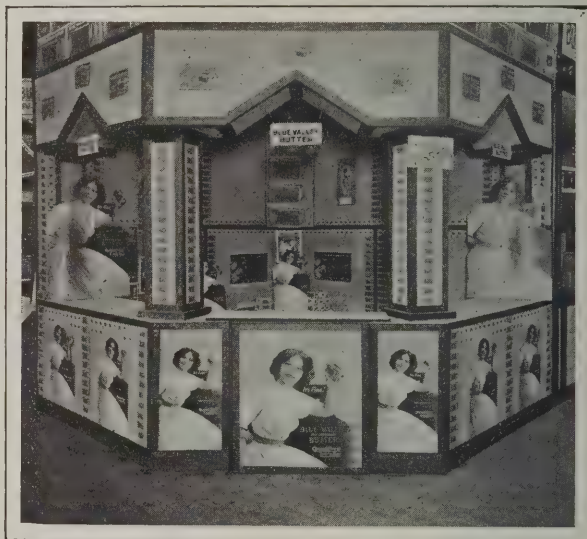
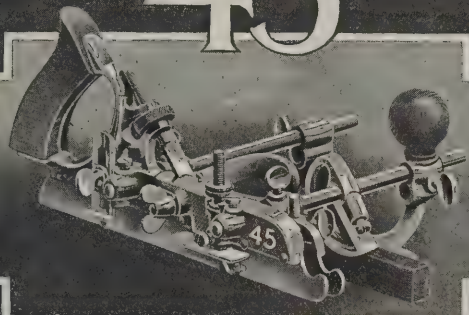


Fig. 6—Showing How the Board May Be Used in Booth Construction

because it is slow burning; is vermin proof; retards the passage of snow and is applied in such a way that it is easy to remove a panel to reach plumbing, gas pipes, heating pipes or electric wiring.

The Neponset Shingle

In many cities of the country the fire regulations exclude the use of wooden shingles so that there has been created a demand for a roof covering having the appearance of shingles and laid in a similar manner to them, while possessing durability and fire-resisting qualities. During the past few years Bird & Son, 18 River Street, East Walpole, Mass., have been developing a shingle which is now being placed upon the market under the name "Neponset." It is made from the well-known time-tested Neponset roofing product, but is not by any means merely a piece of ready roofing. Each shingle is of uniform size, measuring $12\frac{3}{4}$ in. in length by 8 in. in width and has a slot cut in each one so as to give a decided shingle effect to the roof. Each shingle is carefully built so that it is thick at the butt and thin at the top and is laid on a roof just like a wooden shingle. Only 452 Neponset shingles are required to cover 100 sq. ft. of surface and on this account they can be laid, it is claimed, more quickly than wooden shingles, there being no waste of time in trimming and fitting. Each shingle consists of three built-up layers of material and on the roof there are never less than seven of these layers in any one place. The fire-resisting qualities are such that a burning ember or spark falling upon a Neponset shingle roof does no

Stanley
ToolsStanley
45SEVEN PLANES
IN ONE

This well known and very useful Plane has long been recognized by tool users in general, as a valuable addition to their Kit of Tools.

In a compact and practical form it combines **SEVEN PLANES IN ONE** as follows:—1. Beading and Center Beading Plane. 2. Plow. 3. Dado. 4. Rabbet and Filletster. 5. Match Plane. 6. Sash Plane. 7. Slitting Plane.

However, though combining only seven distinct types, it accommodates cutters of different widths, so that in reality, it replaces many more than just seven Planes.

Twenty-one separate cutters are furnished with each Plane, comprising ten Plow and Dado, seven Beading, one Filletster, one Sash, one Match and one Slitting Tool. Twenty-four additional cutters are regularly carried in stock.

All metal parts are heavily nickel plated and the handle, knob and fence are made of selected rosewood.

The Plane together with its twenty-one cutters weighs approximately 9½ lbs. and the entire outfit is packed in a handsome metal box.

FOR SALE BY ALL HARDWARE DEALERS.

LIST PRICE, \$7.00.

An attractive twelve-page booklet explaining in detail the different uses to which **STANLEY "45"** may be put has just been published. May we send you one?

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

Stanley
Tools

Clyde Line Piers on the Delaware River, Philadelphia, covered with Genasco stone-surface Ready Roofing which has successfully withstood the elements for years.

Asphalt-saturated felt
Trinidad Lake Asphalt
Asphalt-saturated felt
Trinidad Lake Asphalt
Gravel

Look to the waterproofing of roofing—that is where it will stand or fall.

You must know the value of the waterproofing to determine the endurance of the roofing.

Genasco

THE TRINIDAD-LAKE-ASPHALT
Ready Roofing

is made of this everlasting water-proofer that has *natural* oils sealed in it by Nature to give it life and resisting power.

Asphalt in Trinidad Lake has withstood the burning sun and terrific storms of that tropical climate for centuries. In Genasco Ready Roofing it withstands every weather-condition in all parts of the world, and gives lasting protection.

Don't be misled by the *looks* of roofing. Look to its waterproofing—the *real proof* of roofing.

Mineral or smooth surface. Guaranteed. The hemisphere trademark is your guide. Write us for the Good Roof Guide Book and samples free.

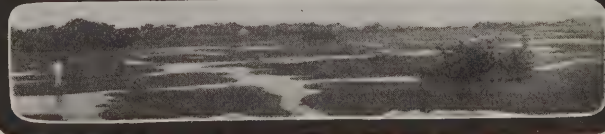
The Kant-leak Kleet goes with Genasco smooth surface roofing—waterproofs the seams without cement and prevents nail-leaks.

The Barber Asphalt Paving Co.
Philadelphia

New York San Francisco Chicago

Largest producers in the world
of asphalt and ready roofing

Trinidad Asphalt Lake





Time and Labor Saved and
the Owner Satisfied

STANLEY'S
No. 165

Ornamental Surface Butt

BEVELED EDGE
UNEQUALED IN QUALITY

With these Butts it is not necessary to mortise the door, as the ornamental leaf screws on the surface.

The Butts can be changed to either right or left hand by simply unscrewing the slotted tip and reversing the pin. Sizes 1½ to 4½ inches.

The Guaranty



of Quality

Write us for a Handsome Booklet of
Wrought Steel Hardware

Department E.

THE STANLEY WORKS
NEW YORK NEW BRITAIN, CONN. CHICAGO



Beautiful houses from
Illinois to Massachu-
setts are
roofed with
Reynolds
Flexible
Asphalt
Shingles

A multitude of pretentious residences in a score of states are giving ample proof of the long-lasting surface of

Reynolds Flexible Asphalt Shingles.

Every type of modern home can be protected and beautified, at lower cost, with these time-tried, weather-tested shingles. They withstand the ravages of driving rain, pelting hail, hottest sun and heaviest snow without warping, cracking, splitting, curling or blowing off. Sparks cannot set them on fire. Long exposure cannot dull their rich color. Adaptable to every style of pitched roof, and make possible unusual architectural effects, such as roll edges, thatch effects and rounded corners.

Reynolds Asphalt Shingles

Guaranteed for 10 Years—
will wear many years longer

Rough-surfaced weather defiers made of crushed slate or granite securely embedded in pure asphalt. Natural colors of garnet, red or gray-green which *never fade and never need painting*. We are the original makers of flexible asphalt slate shingles and tested them for ten years before putting them on the market. They are uniform in size—8 ins. by 12½ ins.—and are laid 4 ins. to the weather. Easily and quickly laid.

Let us send you a booklet showing photographs of modern houses roofed with Reynolds Asphalt Shingles—signed opinions of owners are included. Also opinions of leading architects and builders. Write for a copy TODAY.

H. M. Reynolds Asphalt Shingle Co.

159 Grant St., West, Grand Rapids, Mich.

Established 1868. Members National Builders' Supply Association

harm. We understand that a sample of this shingle will be sent to any architect or builder making application to the address above given.

Instruction by Mail for Architects and Builders

The young man who intends to make a success of his chosen calling, whether it be in the building or architectural line, must fortify himself with a thorough knowledge not only of that particular branch but also of all others which may have a bearing upon it. The present is an age of progress and success comes to those who are best equipped to fight the battle at all points and solve in a practical way the problems which are constantly arising. Our modern structures are the product of men of brains who thoroughly understand their business in all its multitudinous details; of men who are able to plan the position and use of every piece of material for a building long before it is shaped, quarried or delivered to the site of construction; and when delivered the workmen must be able to handle the materials, to understand the drawings that direct its placing, and to work intelligently with members of other trades as well as with the architect himself. It is the principles involved in the above which constitute the foundation of the success of the American School of Correspondence, Chicago, Ill., which for the past 15 years has been giving practical instruction by correspondence in the building trades, and in this connection it is interesting to note something of the history of the school and to know in a measure at least how its work is carried out.

The American School of Correspondence was founded in Boston in 1897 as an "Institute of Learning" under a charter from the Commonwealth of Massachusetts; in 1902 the school was removed to Chicago, where it became associated with the Armour Institute of Technology, and for five years it conducted its work in co-operation with that Institution. In 1907, having outgrown its quarters, the school erected at 58th and Drexel Streets its present Administration Building, especially designed for correspondence work. It is a five-story structure, about twice the size of the average high school building, which it somewhat resembles, but it holds no students, as the space is occupied by officers and instructors and by the many persons required to carry on the affairs of the School. It is equipped throughout with every modern device for facilitating the work of the institution. It maintains many conveniences for the comfort and physical well-being of its force, there being among others a free circulating library containing approximately 1,000 volumes of current fiction of the better class; a wholesome "home-cooked" luncheon at the exact cost of its preparation, and comfortable lunch room and free tea and coffee for young women stenographers and clerks who bring their own luncheons. The school originally offered only six courses, but the immediate success of its work brought it more than 7,000 students the first year, and necessitated the gradual broadening of its scope. Today it offers almost a hundred different courses in all branches of building, engineering, law, commerce and fire insurance, and gives instruction in every part of the English-speaking world; it numbers its students by the tens of thousands and its graduates by the thousands.

The American School of Correspondence is based upon the principle that every man is entitled to a good education, and that, if he cannot go to school, the school should go to him. It encourages every man to make the most of his opportunities by improving his spare time, and shows him in a practical way how to do it. It has made correspondence study so practical that its students graduate from their studies into well paid positions, and has put its courses within the reach of any man who possesses ambition and the will to work. The school draws its students principally from young men and women of the great middle class, who realize the necessity of a good education, but who are unable to attend resident schools.

The school is chartered under the same laws as a state university and its staff comprises, as officers, instructors and editors, men who have been graduated from the best known universities and technical schools in the country, or who have gained their knowledge by years of practical experience. The school employs as instructors men only, as they alone have the broad understanding of the personal instruction necessary in correspondence teaching.

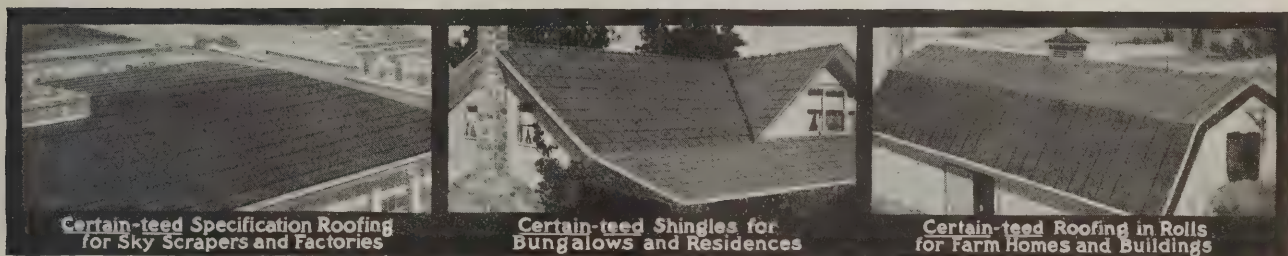
For the production of its special textbooks, and other printed matter necessary to its work, the school maintains a corps of experienced editors, proofreaders, etc. A new textbook can be placed in the hands of the student within thirty days from the time the manuscript is received from the author; yet the school is working continuously to get out new texts and to revise the old ones that cover the subjects taught, now almost five hundred in number.

The school employs no agents. During its early days it had a few agents in the field, as much to discover the educational needs of the people as to solicit business; for

(Continued on page 42)

Please quote BUILDING AGE when writing to advertisers.

Carpenters, Builders—there is a simple method of applying Certain-teed Roofing on any kind of a building



Certain-teed Roofing

(Quality *Cert*-ified

Durability *Guaran-teed*)

Guaranteed 15 years—wears longer

Rolls and Shingles

The roofing that has “made good” on the roof

When ready roofing was first put on the market, many architects, builders and carpenters preferred to wait and see it tested on the roof.

The ready roofing that won out had to do so on merit. Certain-teed Roofing settled all arguments by giving absolute satisfaction in all climates and under severe conditions. Its use on all kinds of buildings has grown by leaps and bounds.

The durability of this modern, easy-to-lay Certain-teed Roll and Shingle Roofing is remarkable—it is guaranteed for fifteen years and will last much longer.



Look for the
Certain-teed
Quality label on
each Roll and
Crate of Shingles

Free to builders and carpenters

Apply to the dealer from whom you buy your building materials for our new book, “**Modern Building Ideas and Plans.**” It will help you in your business. It contains valuable ideas and building aids.

Certain-teed Roofing is used anywhere—sold everywhere—
for sale by all dealers and applied by all leading roofers

General Roofing Manufacturing Company

E. St. Louis, Ill.

York, Pa.

Marseilles, Ill.

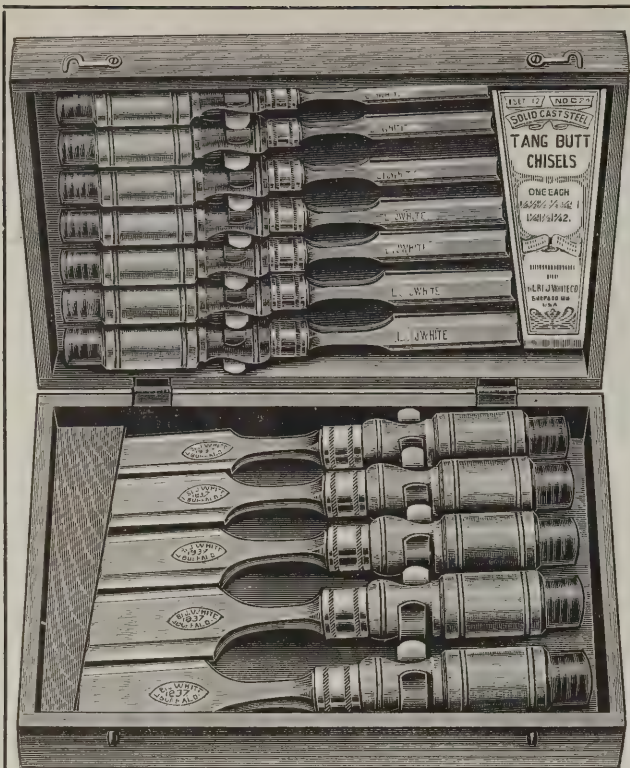
Minneapolis, Minn.

San Francisco, Cal.

Winnipeg, Man.

London, England

Hamburg, Germany



The finest chisels on the market, every one of them guaranteed satisfactory. The White chisels are known everywhere as the best and this is one of our best sets. At your dealers.

If you have trouble getting them, write us direct.

The L. & I. White Co., Buffalo, N. Y.

the school believes that the methods of the average agent are not compatible with educational work; and that the employment of agents places upon the student an additional expense from which he receives no adequate return. The school, therefore, depends upon its usefulness for its growth, and it is significant that more than half of each year's new students enroll upon the recommendation of present students and graduates; while it has been said that the announcements of the American School prove that an educational institution can advertise effectively and still maintain the dignity of an institution of learning.

It is said repeatedly, and with considerable truth, that the man who works his way through college gets more real good out of his college course than the man who merely has to ask for what money he wants. An overwhelming majority of American School students pay their own expenses, either by working a little harder or by living a little closer; and practically all of them make many sacrifices in order to get the time for their studies.

Variety Saw No. 330

It is generally conceded that the Variety Saw is one of the most important adjuncts of the equipment of every well-managed woodworking shop operated by the carpenter-contractor or the builder, owing to the fact that,

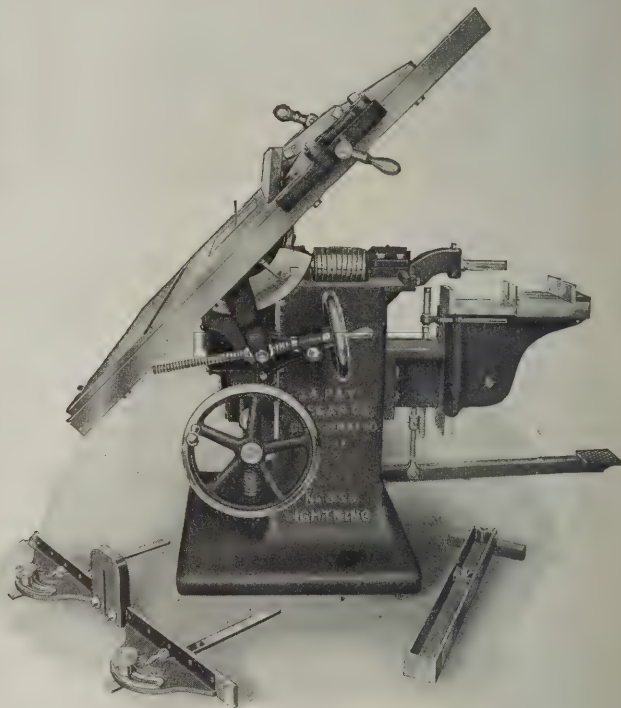


Fig. 7—Variety Saw No. 330, Showing Tilt of Table

as its name implies, a great variety of work can be executed by means of it. Improvements are constantly being made in woodworking machines in order to keep them thoroughly up-to-date and one of the latest is the machine which we illustrate in Fig. 7 of the engravings and which is now being placed on the market by the J. A. Fay & Egan Company, 221 to 241 West Front Street, Cincinnati, Ohio. It is stated that special care has been taken in the design and construction of the machine which is such that all adjustments are easily and quickly accomplished. It is made in two sizes, the larger one having a 36 x 42 in. heavily ribbed cast iron table mounted on rockers and angles 45 degrees by means of a hand wheel and screw, a micrometer index showing the exact angle of tilt. It has an elaborate fence equipment and by means of a wooden throat plate, molding, jointing, grooving, rabbeting, dadoing or gaining heads up to 2 in. wide may be used. Two miter fences with brass indicators and yoke for using both at one time are furnished with the machine. A hood and chute guard the lower part of the saw. By loosening a single thumb screw the hood may be removed for easy access to the blade. The smaller size of machine is similar to the No. 330 regular except that the table measures 27 x 30 in. and the fence equipment is not so complete. The regular machine is fitted with hollow chisel mortising and boring attachments rendering it a really complete woodworker. It is stated that mortises from $\frac{1}{4}$ to $\frac{3}{4}$ in. by 3 in. deep can be made in stock up to 16 x 8 in. in cross section. When the mortising attachment is not necessary the machine is equipped with boring attachment only, this being similar in construction and capacity to the hollow chisel mortising at-

(Continued on page 44)

With These Two "Yankee" Tools

(Quick Return No. 130
and Screw Holding Bit)

you can drive or draw a screw 3 feet overhead, in tight corners, or most any other out of reach place. Besides this, you get the same service as with the famous No. 30, which you doubtless now have in use. The No. 130 "Quick Return" shown here has a spring in the handle which quickly drives the spindle back for the next stroke. Add the Screw Holder to this and you see at once what a tremendous advantage you have in this tool, especially in overhead work.

It also permits you to hold the work in the one hand while you start and drive the screw in some out of reach place with the other. For all convenient and close range work this is the quickest "Yankee" Screw Driver we have yet put out.

If your dealer cannot supply you, we will mail you the two for \$2.25.

Write us for the "Yankee" Tool Book. It tells about every tool we make. A postal brings it.

NORTH BROS. MFG. CO.
Lehigh Ave. Philadelphia, Pa.

ASH for CONTRACTORS & CARPENTERS

\$TORM \$ASH and DOOR\$

Write Quick for Special Proposition



SIBERIA—
Painted

No. E 224—1½
in. Thick

2-	6¾	x6-	7	\$1.37
2-	8¾	x6-	9	1.43
2-	10¾	x6-	11	1.59
2-	8¾	x7-	1	1.60
3-	0¾	x7-	1	1.64

Do you realize how much extra profit you can make in the next month or two by taking contracts for the installation of storm sash and doors?

We are going to make it an object for you to push this branch of your business harder than ever before.

The extraordinarily Low Prices at which we are now selling Storm Goods of highest guaranteed quality, reinforced by the Special Proposition we are making to Carpenters and Contractors exclusively, mean dollars in your pocket if you don't wait too long.

We carry the largest stock of White Pine Storm Sash and Doors in the country and sell them at about half dealers' prices. Prompt shipment, safe delivery and satisfaction guaranteed.



65c and Up

\$200 Cash Prize Offer!

Write at once for details of Special Proposition to Carpenters and Contractors—\$200 in cash prizes to be distributed between September 15th and December 15th, 1913.

Gordon-Van Tine Company

666 Federal Street

Davenport, Iowa

Black Diamond File Works

ESTABLISHED 1863

INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.

Owned and Operated by Nicholson File Company.

tachment except that the chisel holder, front fence and treadle are eliminated. In order to make this Variety Saw as safe as possible an aluminum saw guard, made by the company, will be fitted to either type, the guard giving most efficient protection without interfering in any way with the operation of the machine. The boring and mortising attachments can be fitted to the smaller size of machine as well as to the larger one.

Advantages and Conveniences of Sliding Doors in the Modern Home

In a recent issue we published the essay regarded by the judges as the best in a prize contest for the best 200 word article on the "Advantages and Conveniences of Installing Sliding Doors in the Modern Home" conducted by the Richards-Wilcox Mfg. Company, Aurora, Ill., and at this time we give the article that was awarded the second prize, the author being John P. Higgins of the Gregg Hardware Company, Detroit, Mich.

"Anyone about to build a modern home should consider carefully the many advantages and conveniences of sliding doors over hinged doors.

"By the use of sliding doors, two different designs and color schemes may be carried out in adjoining rooms, without spoiling the whole effect by the odd finished door and different trim showing in the room where it opens.

"When partly open, it cannot slam in a draught, or stand out in the room in the way of everyone, and when open wide does not cover up decorations and pictures, or require furniture to be moved to make room for it.

"While a sliding door improves the appearance of the rooms and operates smoother than a hinged door, it will not interfere with draperies hanging in the same opening and does not require an opening at the floor to allow it to swing clear of the rugs.

"Sliding doors are particularly desirable for closets, saving all the clear space in the bedroom, which would otherwise be necessary to allow the swinging door to open, doing away with marring caused by the two doors coming together, and the annoyance of having the knobs locking one over the other."

Catalogue of Rock-Ore and Gravel Handling Machinery

A serious problem in the moving of materials by means of conveyors is that of the friction resulting from the pull of the chain or belt due to its own weight and that of the product carried. Any means which will reduce this friction without the introduction of other objectionable features into the design, produces economy in operation due to the saving in power required and in maintenance expense. The roller chain with sprocket pulleys makes possible the supporting of the chain between pulleys, thus relieving to a great extent the pull due to weight of chain and load.

The TelSmith Double Roller Chain Elevator is a new machine placed upon the market by the T. L. Smith Co., Milwaukee, Wis., and described and illustrated in its catalogue No. 252, just published. The roller travels upon angle iron tracks, both on the upward and descending course. The return tracks serve to prevent any sagging or swinging of the descending bucket and each bucket is independently supported. The buckets are of the continuous type, being set close together so that they almost touch one another. The back of each bucket is flanged to serve as a chute for the stones from the following bucket. This construction is intended to prevent the stone from spilling as the buckets pass over the head sprocket and is said to make practicable a relatively slow speed of travel. The buckets are attached to double roller chains with malleable links, each link carrying a 2½-in. roller, the latter turning upon heavy shoulders cast into the links. The chain carriers pass over heavy cast-iron sprocket wheels at the head and tail. The head and pinion shafts are supported by heavy cast-iron babbitted angle pillar blocks. The tail shaft runs in protected screw take-up boxes which can be adjusted to remove any slack from the roller chain.

A new portable bin is also illustrated, the hoisting mechanism for which consists of a hand wheel and a worm at each end of the bin. These worms are attached to a long shaft and mesh with heavy worm gears, which in turn drive the cross shafts upon which the hoisting cables are wound. The bin is so arranged that a screen can be easily mounted upon it. Where the screen is equipped with dust jacket, a special steel hopper is inserted inside the bin and the discharge chute is run through the side of the bin, independent of the 6 regular discharge chutes. All chutes are controlled by means of a cord and counterweight. Suggestions as to the design of conveyor plants

(Continued on page 46)



**THE
SIMONDS
SAW**

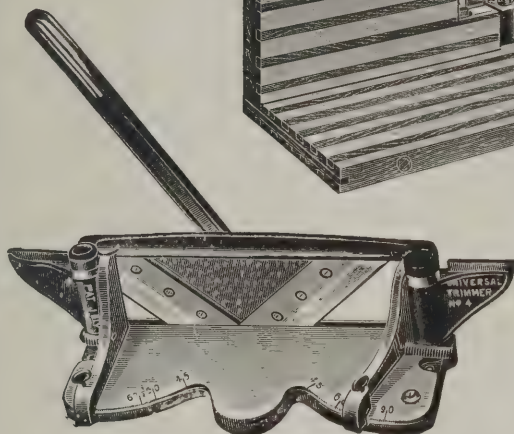
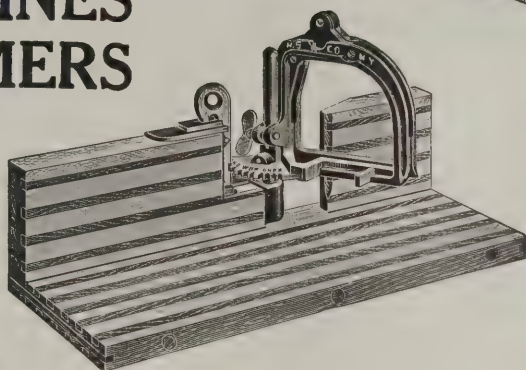
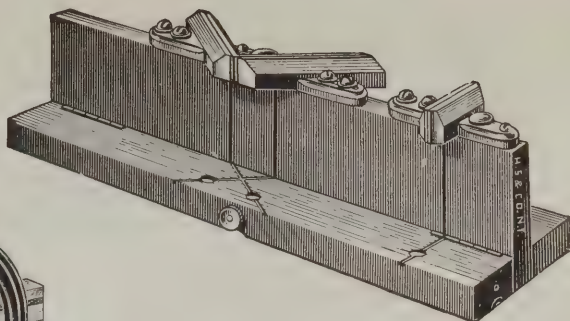
is built on honor. Every saw which leaves the Simonds factories is inspected and its quality is guaranteed.

**Ask Your
Dealer**

SIMONDS MFG. CO.
FITCHBURG, MASS.
CHICAGO, ILL.

WARRANTED
The Simonds Saw
FITCHBURG MASS. CHICAGO ILL.
MADE IN U.S.A.
BRANCH HOUSES
NEW ORLEANS, PORTLAND, ME.
ST. LOUIS, MO. ST. PAUL, MINN.
PHILADELPHIA, PA. PITTSBURGH, PA.
RICHMOND, VA. WASHINGTON, D.C.

MITRE BOXES MACHINES TRIMMERS ETC.



We have 16 styles and many sizes; from the ordinary old-fashioned wooden mitre box up to the Marsh-Langdon all-metal machine to cut any angle; including Hand and Foot Mitres, Trimmers, etc.

We have a 16-page catalog showing them all which we will send to those who specify Catalog No. 3141.

WORK BENCHES: We have a new catalog No. 3142, showing 23 distinct styles. Will send copy upon receipt of request.

HAMMACHER, SCHLEMMER & CO.

HARDWARE, TOOLS AND SUPPLIES

NEW YORK, Since 1848

4th Ave. & 13th Street

A Mould for Plaster Cornice of Rooms

WILL you examine this new device—"The Monarch Patent Cornice Mould," if we send it FREE—even the transportation charges fully prepaid?

I know what it is to fuss around after you get to the corners of the room, to make the cornices, etc. I was up against that for years on every job. At last I put my thinking cap on. Took me a year or more to get the right idea, and another year to try the device out thoroughly to see that it worked and worked right.

I know now that my mould will make straight cornices and perfect corners every time without your using any other tools, and I know what I'm talking about when I say that my mould will save its cost on every job. THE MOULD WILL MAKE IT EASY FOR YOU TO UNDERBID THE OTHER FELLOW AND YET LEAVE YOU AS GOOD A PROFIT AS HE HAD FIGURED ON MAKING WITHOUT THE MOULD.

I don't care if you're "from Missouri!" or elsewhere. I can show you—and I'm willing to show you **without it costing you a cent.** Just fill in the coupon, mail it, and the trick's done. You'll get a mould promptly for **five days' free trial.** Convince yourself thoroughly before you spend a penny.

And here's an added special. To get the mould around the country quickly, I am going to make a **special 40% discount on the first 500 sets.** Regular price is \$50. Forty per cent. off makes the cost price \$30, or \$33 if in installments of \$3 a month for 11 months. Either way suits me—I'm willing to trust my brother carpenters, builders and contractors.

YOU need this mould in your business—it will save its cost on nearly every job—and you can pay for it piecemeal out of the saving.

TIMOTHY F. HORAN

10 MAPLE STREET

COOPERSTOWN, N. Y.

Timothy F. Horan.

10 Maple St., Cooperstown, N. Y.

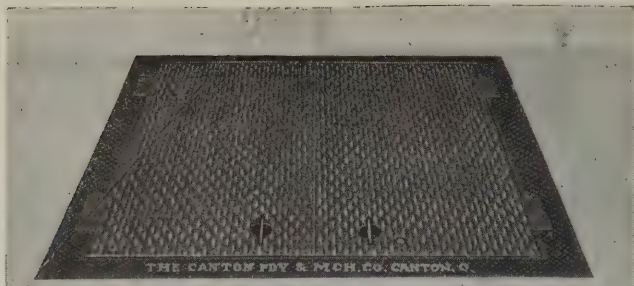
Dear Sir:—Please send me the Monarch Patent Cornice Mould free for 5 days' trial. At the end of that time I will either return the Mould or else remit \$30 (cash price of \$50, less 40% special discount) or remit \$3 and then \$3 every month thereafter for 10 months (making \$33 special installment offer).

I understand the Mould will make straight cornices and perfect corners; will make any style and size of cornice with complete corners, as well as straight work.

Signed

Address

Send no money—merely
mail the coupon—today.



DON'T Buy a Door Which Will in a Short Time Look Like This

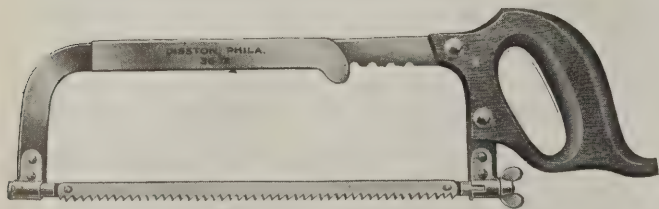
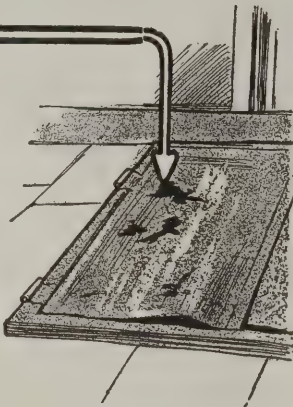
Investigate and you will see that "Canton" side-walk doors excell.

The "Canton" has solid wrought steel top and is practically indestructible.

The "Canton" fits flush with the sidewalk and remains firm and neat. No obstruction to cause tripping. A checked surface obviates slipping, and drains take care of water seepage.

Catalogue "B. 6" gives full particulars about Canton doors and other builders' supplies. Ask for it.

Canton Foundry & Machine Co.
Canton, Ohio



The New DISSTON Adjustable Frame Hack Saw

Disston Hack Saws, like all goods bearing the Disston Brand, are universal favorites. This is our No. 36½—the very latest and most efficient of extension frame Hack Saws.

Has a closed handle of Apple wood; nickel-plated steel frame, adjustable by half inches to take in blades 8 to 12 inches in length. Riveted sockets and reversible stretcher that will not fall out while re-adjusting.

The ideal blade for all Hack Saws is the

DISSTON "Chromol" Blade

This blade is hardened throughout by a special process, and has the teeth milled in. Made of a high-grade steel manufactured for the purpose, and impossible to duplicate.



HENRY DISSTON & SONS, Inc.

KEYSTONE SAW, TOOL, STEEL AND FILE WORKS

Reg. U.S. Pat. Off. PHILADELPHIA

U. S. A.



will be furnished by the engineers of the company to any one mentioning *The Building Age*.

Catalogue of Sheet Metal Ceilings

A book of some 68 pages of special value to the sheet metal worker who is handling and erecting sheet metal ceilings has been issued by the Edwards Mfg. Company, 423-443 Eggleston avenue, Cincinnati, Ohio. This booklet comprises many illustrations which show the regular designs of metal ceilings manufactured by the Edwards company. In addition thereto, there are a goodly number of views of interiors showing the effect that may be attained by a judicious selection of these designs. Needless to say the numerous designs shown vary in style and are intended to be sufficiently complete to allow the sheet metal worker to satisfy his customer who may be especially particular as to the character of design desired. There are also the usual appurtenances, such as cornices, fillers and the like. In addition to this, there is a complete code of directions for ordering and instructions for applying. The merits of Edwards side walls and ceilings are also set forth in the catalogue, which is attractively compiled and bound with a cover design printed in four colors, which gives a rather decorative effect. A copy of this may be secured by any reader of *The Building Age* who may write to the company at the address given.

Laying Corrugated Iron Roofing

The following suggestions relative to the laying of corrugated iron on the roofs of skeleton frame buildings are contained in catalogue No. 10 of the Berger Mfg. Company, Canton, Ohio, just issued: "We would not advise the use of corrugated iron on any roof of less pitch than three inches to the foot, and more is better. Truss roofs should have pitch of 1/5 to 1/4. for corrugated iron roofing, 26 gauge and lighter had better be laid on close boarding or strong lath, not more than one foot apart. No. 24 can be used on purlins two to three feet from centers. Nos. 22 to 20 can be used on purlins three to four feet from centers. No. 18 can be used on purlins four to eight feet from centers. No. 16 can be used on purlins five to six feet from centers." Other suggestions relative to the use of sheet metal are contained in this catalogue, which is a very complete index to the sheet metal industry, in that it lists sheet metal products ranging from corrugated iron roofing, stamped siding and ventilators, to steel filing cabinets, metal ceilings and tower finials. The manufacturers state that a copy of this publication will be sent to any reader of *The Building Age* who mentions that publication in his letter of application.

Fireproof Window Construction

Wire glass retards fire without hiding it, and this is one of the chief considerations which have resulted in its extensive use in recent years. Four styles are manufactured, namely: the ribbed, the rough, the maze, and the polished. Each style has wire netting embedded in its center during the process of manufacture, the temperature at which the wire is embedded in the molten glass insuring cohesion between the metallic netting and the glass, and the two materials become as one, so that if the glass is broken by shock, intense heat, or other cause, it remains practically intact. The improvement in manufacture during the past few years has produced annealing processes that greatly reduce the tendency to crack. Polished wire glass is less liable to crack than the rough grade, as the strains and heat of polishing are a severe test in themselves and the stock which survives this treatment is therefore selected quality. A specification for double hung wire glass windows has been suggested by the S. H. Pomeroy Co., Inc., 282-296 East 134th street, New York City, which specification applies to that company's hollow metal double hung window No. 60. These specifications require that the windows shall be of hollow construction, manufactured of No. 24 gauge galvanized iron for frames and sash, the latter to be constructed with extending flanges on the stiles to operate in the grooves of the pulley stiles, and so divided by muntin bars as to comply with the Underwriters' rules in regard to glass area. The sash is hung with Underwriters' sash chain, the frames and sash are designed with riveted members, and solder is used for weathering purposes only.

A Red Veneered Shingle

Since the introduction of the Asbestos "Century" Shingle in this country some seven or eight years ago, the demand for the red shingle has been constantly increasing. The red roof has ever been found in demand to carry out

(Continued on page 48)



QUIET DOORS

are a necessity in the homes of business, and the Corbin door check is recognized as the best means for eliminating noise. There are a number of buildings in which more than 2000 are used, all working quietly and efficiently and giving satisfaction.



Send for the "DOOR CHECK BOOK" a guide to quiet doors.

P. & F. CORBIN

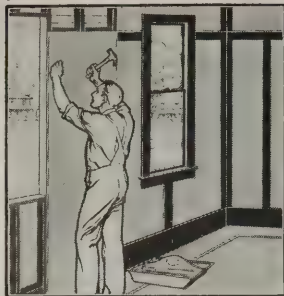
The American Hardware Corporation Successor

NEW BRITAIN, CONNECTICUT

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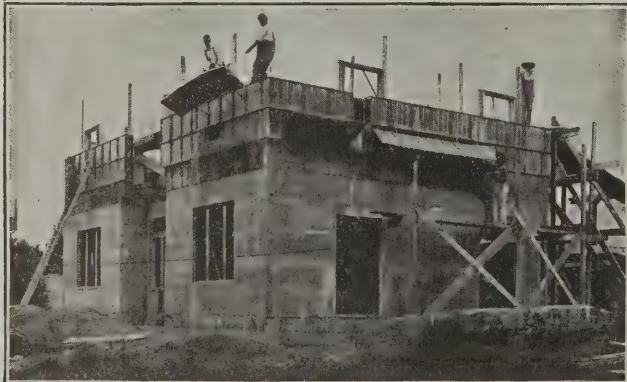


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certain architectural effects and color harmonies and the difficulty in obtaining a satisfactory red roofing medium at a minimum cost is one that frequently confronts the prospective home builder and architect. In addition to the red Asbestos "Century" Shingles that are on the market and which themselves figure somewhat cheaper than red slate, there is now obtainable what is commercially known as a Red Veneered shingle. This is a shingle the body of which is gray cement color, surfaced with a layer of rich Indian Red color. The makers of this shingle claim that by the process of manufacture under which their shingles are produced it is possible to manufacture a shingle of one color mixture, and after the process has reached a certain point to complete the shingle with a mixture of an entirely different color without changing or affecting the structural condition of the sheet as a whole. The effect produced in using a Red Veneered shingle is identically the same as in using the Solid Red and the cost is considerably less. These Red Veneered shingles have been very widely used and the claims of the manufacturer have been substantiated by actual experience. The shingle is not simply a sheet of red material and a sheet of grey material pressed together, but in every respect it is identical with the ordinary Asbestos "Century" Shingle made in solid color. This innovation in the roofing market should be one of particular interest to those desiring an attractive Red roofing medium at a minimum cost. These Red Veneered Shingles, which are made by Keasby & Mattison Co., Ambler, Pa., are said to possess all of the fire resisting and permanent qualities of the regular Asbestos Shingle.

Exhibits for Builders at Minnesota State Fair

At the fifty-fourth annual State Fair of Minnesota there were a number of exhibits of special interest to architects and builders, prominent among them being the following:

Universal Portland Cement Company, Chicago, had an interesting display which strikingly brought out the fact that the company handles only high grade Portland cement for concrete work.

Berger Mfg. Company, Canton, Ohio, occupied a prominent location and displayed its metal window, steel ceilings, expanded metal lath and vacuum cleaning system. The display was the center of much interest on the part of visitors.

The United States Gypsum Company, Chicago, occupied an attractive cottage manufactured of its own products, consisting of "Sackett" plaster board made of gypsum, also "Pyrobar" plaster block, which is a substitute for clay tile.

Cement Tile Machinery Company, Waterloo, Iowa, made a display of its concrete mixers, the "Money Maker" and the "Winner." The operation of the mixers was practically demonstrated and drew the attention of a large number of interested spectators.

Waterloo Cement Machinery Company, Waterloo, Iowa, and the Concrete Machinery Company, of Minneapolis, in charge of W. H. Hale, local manager, demonstrated the merits of their concrete mixers, "Little Wonder" and "Polygon." The former was used on the grounds for the building of two silos for exhibition.

Sterling Machine Company, LaCrosse, Wis., made a display of its "Sterling" Concrete Mixers and brick machines, tools, supplies, etc.

Metal Screen Cottage Company, St. Paul, Minn., makers of open-air cottages, metal frames, porch screens and metal frame window screens, had a number of its cottages located in different parts of the fair grounds, showing the practicability and advantages as compared with the ordinary small frame building.

Wheeling Corrugating Company, Wheeling, W. Va., made an interesting display of its specialties including a butt-joint testable corrugated metal culvert which was regarded as something new in the culvert line.

Concrete Stone Company, Rock Rapids, Iowa, displayed continuous air-space cement blocks for building silos. This peculiar construction is something out of the ordinary in silo building and attracted much attention on the part of builders and farmers.

Northern Insulating Company, St. Paul, Minn., had a small cottage insulated with "Flaxlinum," which was erected to show the merits of this particular product. The claims made for it are that it is rat and vermin proof, keeps out heat, cold and noise and is strong and durable.

Mason City Brick & Tile Company, Mason City, Iowa, had a display of silo blocks, hollow building blocks, fireproofing and brick. One of the leading features was an everlasting silo built of tile. Prominently displayed was the "Denison" load-bearing tile for building purposes, also the "Denison" brand of drain tile.

Nels Erickson of Minneapolis had a most interesting

(Continued on page 50)



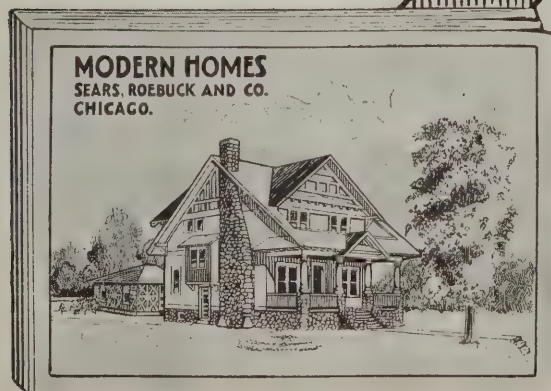
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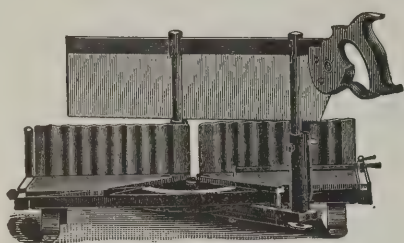
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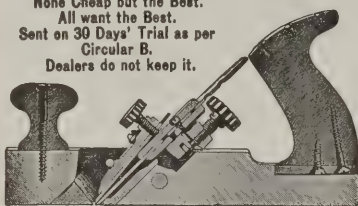
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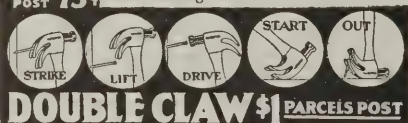
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Dept. B

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display showing various lines of concrete mixers, builders' hoists, derricks, saw rigs, block machines, etc.

Atlas Engineering Company, Milwaukee, Wis., showed its "Atlas" concrete mixer, which is claimed to be particularly well adapted for foundation work, cement floors, silos, cement blocks, fence posts, sidewalks and for small repair jobs.

A Poured Concrete House for \$1000

Among the many interesting examples of poured concrete work there is at Virginia Highlands, a suburb of Washington, D. C., a small cottage which would seem to fill the great need for better and less expensive houses. Economy in plan and construction has been the aim, but without sacrifice of permanency, convenience or attractive exterior. Instead of the usual gravel or crushed stone, coal cinders were used in the mixture, cement and lime being the other ingredients. The statement is made that the "forms" were put up for the entire house, windows and doors dropped into place and the concrete was poured in a single day. The next day the wedges were driven out, the forms removed and taken to the next job. A unique plan was adopted for the foundation since the cellar was omitted. Square holes were dug of proper size and these filled with concrete to the grade level. The steel forms were set up resting upon the earth and extending over these piers, reinforcing bars being dropped in to strengthen the unsupported wall between the piers. The walls are 6 in. in thickness, reinforced with steel bars over and below the windows and doors. This new method of house pouring has been developed by Milton Dana Morrill, an architect of Washington, D. C., as a means of carrying out his plan of permanent, sanitary, inexpensive houses. Several hundred of these houses have now been constructed in various parts of the country and abroad, and steel form equipment is rapidly growing in favor. The steel forms used in the construction work are made by Read & Morrill Concrete Forms Company, 179 Joralemon Street, Brooklyn, N. Y.

TRADE NOTES

American School of Correspondence, Chicago, Ill., calls attention elsewhere in this issue to a special offer which is of timely interest and value to those carpenters, contractors and builders who desire to acquire a technical education. It is pointed out that drafting is the foundation of architecture and that, therefore, a knowledge of this should be acquired. The school offers free of charge to those who enroll at once a complete Cyclopaedia of Drawing, consisting of four illustrated volumes and covering the entire work of the architectural and mechanical draftsmen. The four volumes contain 1720 pages, 7 x 10 in. in size, and 1037 illustrations.

The Oak Flooring Bureau, 895 Hammond Building, Detroit, Mich., is distributing among the trade a small blotting pad bearing upon its face some reference to oak flooring, the three vital qualities of which are referred to as "beautiful, economical and durable." Red oak flooring is described as "classy," and is said to be the best grade in the plain sawed in the 3/4 in. thickness. It is used very extensively over old floors in old homes and over cheap sub-floors in new homes. The claim is made that the best results can be obtained in the 1 1/2-in. face material.

In the first number of "Ideal Ideas," the house organ of the Ideal Concrete Machinery Company, issued from its new home in Cincinnati, Ohio, is to be found a considerable amount of interesting information relative to the concrete block machines and outfits furnished by this concern. The illustrations are half-tone engravings and in addition to the machines and types of block produced by means of them there are pictures of numerous buildings in the construction of which concrete blocks and brick were used. Not the least interesting feature of the little work is a list of the high grade "Ideal" machinery which is fully described in the company's catalogue. In regard to its new home the company states that its location is near all sources of material supplies and it also has the advantage of much cheaper shipping facilities than heretofore. The claim is made that the company can ship to any seaport in the world without touching a rail and what this means to the purchaser of Ideal machines and supplies is readily apparent when it is stated that \$1 will ship a ton of freight 2,000 miles by water as against only 127 miles by rail.

The last issue of Graphite published by the Joseph Dixon Crucible Company, Jersey City, N. J., contains the usual quota of interesting matter relating to Dixon's Graphite productions. One of the leading articles relates

(Continued on page 52)

The Finer Edge for Your Finer Tools

CARPENTERS, pattern-makers, craftsmen, will welcome to their tool-kits the extra hard, extra fine

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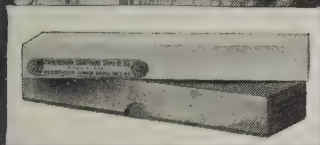
Certain chisels, carving-tools, gouges, etc., require a fine, delicate edge—keen and smooth—an edge that will hold.

The Carborundum extra hard, extra fine stone is just the stone for giving such an edge.—It is velvety, smooth, yet fast-cutting—it is graded hard enough to give the edge the smoothness required for fine work—and the stone is absolutely uniform—it won't glaze or lose its shape.

Made in several sizes of the rectangular stone and beveled slips.

For general bench-work the regular round or rectangular Carborundum Combination stones are recommended.

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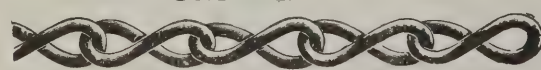
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Cable Chains, Jack Chains, Bell Hangers' Chains and
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to the record made at the plant of the Columbia Tool Steel Company, Chicago Heights, Ill., where Crucible Furnace No. 2 was kept in operation for nearly four years. The illustrations show the foundry crew together with furnace and molds.

An increase of 25 per cent in the capacity of the "Little Wonder" concrete mixer is noted in the recent catalogue of the Waterloo Cement Machinery Corp., Waterloo, Iowa. The capacity of the "Little Wonder Four" being changed to 5 cu. ft. instead of 4 as formerly, and the trade name being changed to "Little Wonder Five." The company states that it is filling all orders for Fours with 5-ft. machines. The price remains the same.

A cam adjustment which makes possible the raising or lowering of the door hanger by the proverbial "simple twist of the wrist" is described in new catalogue No. 12 of the Wagner Mfg. Company, Cedar Falls, Iowa. This vertical adjustment eliminates the necessity of notching the door on the top in fitting the hanger and permits the placing of the door in the opening to the best possible advantage. A monkey wrench is the only tool necessary in raising or lowering the hanger. Another feature to which attention is called is the self-cleaning track upon which the trolley wheels run. A cross section of the latter shows an opening in the bottom only, preventing access of dust, and the wheels are designed to fit so closely the inside cross sections of the track that they will push out any foreign matter which lodges on the bearing portion. A bumper on the end of the hanger bar prevents the trolley wheels from striking against the end of the tracks. These door hangers are manufactured for sliding doors in the rooms of residences and for garages, etc.

Universal Portland Cement Company, Chicago, Ill., has just issued from the press the sixth edition of that very attractive and interesting booklet "Concrete Silos." In view of the extent to which silos are now being built the booklet in question is of unusual value to the rural builder and especially to the farmer on whose property constructions of this character are an important adjunct of the farm equipment.

The city of San Antonio, Texas, comes in for discussion in the current issue of "Expanded Metal Construction," the trade organ of the Northwestern Expanded Metal Co., 904 Old Colony building, Chicago. Numerous half-tone cuts illustrate residences and office buildings in which the Northwestern expanded metal lath is used. A particularly good example following the mission style is the residence of A. Salisbury, the San Antonio representative of this company.

Information on asbestos protected metal is graphically presented in Bulletin No. 53, issued by the Asbestos Protective Metal Company, Beaver Falls, Pa. In addition to giving a number of half tones of various types of industrial and business buildings which are covered with the asbestos steel construction, there are also half tone engravings showing the method of attaching the material to the purlins and other constructive processes showing the different uses to which the material can be put both as a roof covering and as siding. There is some information given, under the title of "Properties of Asbestos Steel Roofing," which outlines its mechanical construction, its proof against corrosion, insulation, against heat and fire, the ease with which it can be attached to a building, its lightness and the appearance which it contributes to substantial buildings. There are also tables to help the contractor who is estimating on this class of work.

E. W. Edwards, president Edwards Manufacturing Company, Cincinnati, Ohio, recently returned home with his family from a summer vacation in the White Mountains of New Hampshire. Mr. Edwards, who is an enthusiast of the sport won the New Hampshire golf championship, defeating a large number of Eastern players.

The "Red Devil" Tool factory has just issued an illustrated booklet giving net prices of 3,000 "Red Devil" tools and any reader who may be interested can secure a copy of the booklet by addressing the Smith & Hemenway Company, 150 Chambers Street, New York City.

At the next Illinois State Fair the Universal Portland Cement Company, Chicago, Ill., will erect a complete concrete silo as they have already done at several of the other fair grounds.

The last issue of Door-Ways, the house organ of Richards-Wilcox Mfg. Company, Aurora, Ill., tells among other things how "R-W" door hangers are sold; points out two distinctive features of "R-W" grindstone fixtures, and illustrates some interesting comments on "the advance of parlor door hangers." There is also considerable com-

(Continued on page 54)



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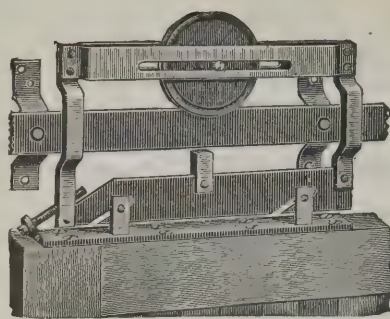
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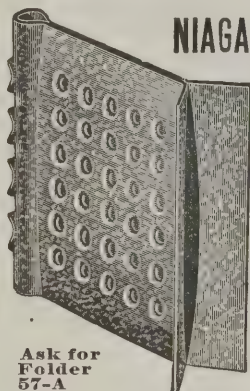
In an attractively printed pamphlet of a size convenient to carry in the pocket, Follansbee Bros. Company, Pittsburgh, Pa., set forth the merits of Scott's Extra Coated Hammered Open Hearth Tin Roofs. The illustrations are well-executed half-tone engravings showing some of the many buildings in connection with which this form of roof has been used.

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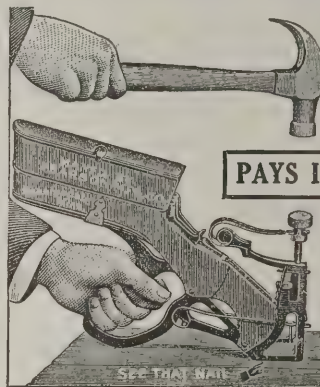
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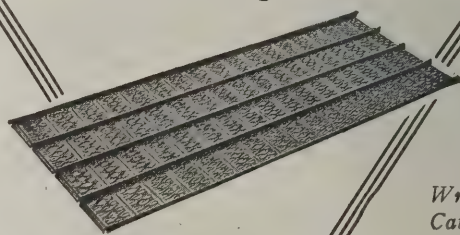
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Managing Editor, HENRY COLWELL, 239 West 39th St.,
New York.

Business Manager, JNO. B. BENNETT, 239 West 39th St.,
New York.

Publisher, DAVID WILLIAMS COMPANY, 239 West 39th
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Stockholders: UNITED PUBLISHERS CORPORATION,
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holding 1 per cent or more of total amount of bonds, mort-
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of September, 1913.

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Certificate filed in New York County.
(My commission expires March 30, 1914)

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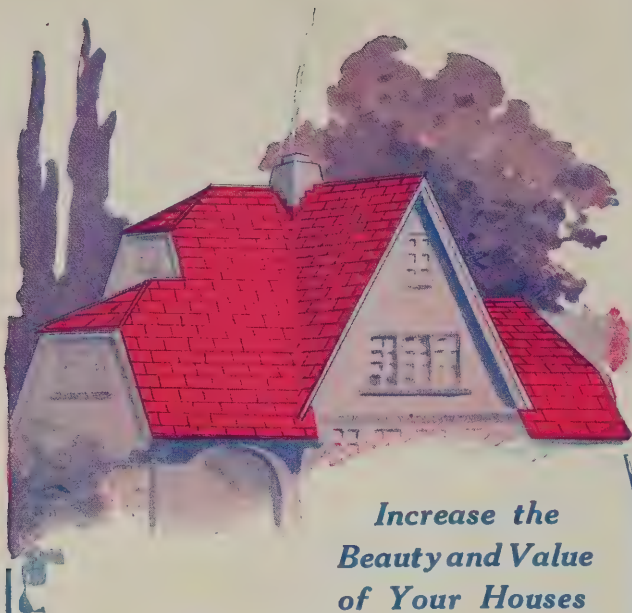
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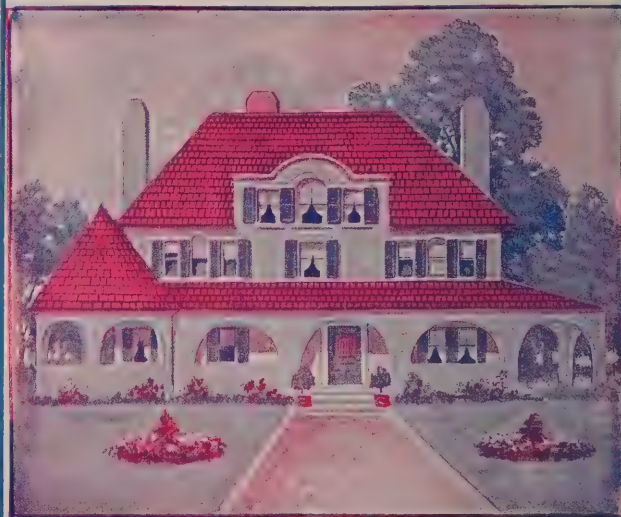
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THE BUILDING AGE

NEW YORK, NOVEMBER, 1913

A CALIFORNIA HOUSE OF JAPANESE ARCHITECTURE

The Treatment of the Roof One of the Noticeable Features—The Rugged and Unusual Nature of the Immediate Surroundings

BY CHARLES ALMA BYERS.

THERE is hardly a country in the world from which the American architect has not at some time or other borrowed ideas for his home building. His adaptations from England, Germany, France, Spain and Italy long ago became more or less common throughout the country—so common, in fact, as to practically constitute our only styles of architecture since we are accused of possessing none of our very own. More recently he has imported the bungalow from India, the *chalêt* from

owes more to its adapters than to its originator?

As an example of the result of the American architect's invasion of Japan, the house illustrated herewith is especially interesting. Although it has undergone many modifications in being adapted to the needs of an American family, it is particularly suggestive of the architecture of the Flowery Kingdom. Nor does the suggestion of Japan rest with the architecture of the house alone; the surrounding grounds, with



A California House of Japanese Architecture—Designed and Built for Mr. Wickliffe Matthews by Matthews & Matthews, of Los Angeles, California

Switzerland, and during the last few years he has even invaded Japan for suggestions. His resourcefulness in this direction has, incidentally, as has often been pointed out, given us greater cosmopolitanism in our home architecture than is enjoyed by any other country; and, even though we may have no architectural styles that may be truly called our own, the interpretations put upon our borrowings have, at least in many instances, resulted in improvements, and other modifications that give our homes a certain American distinctiveness. And, anyway, is it not often true that a particular style

their arched bridges and odd gateways, are of Japanese effect also.

The house, which is the home of Wickliffe Matthews, is located in Los Angeles, Cal., a city especially noted for its cosmopolitanism of architecture, and was designed and built by Matthews & Matthews, 329 Douglas Building, Los Angeles, Cal.

The house is located on a sloping hillside, and instead of being converted into the usual grassed and well-kept plot the grounds have been left rough and irregular. In fact, by the use of cobblestones and

boulders they have been made even more rugged than was intended by nature, and the graveled paths that wind about the house and climb the hillside aid still further in the creation of rustic surroundings. A sort of wild moss takes the place of bluegrass, and a haphazard arrangement of flowers, dwarfed pines and other shrubbery gives the house an ideal setting.

The house itself sits on a sort of ledge that has been created in the hillside and is thereby given a level foundation. It is three stories in high, but on account of its location and its flat roofs it does not appear unusually tall. The one feature that probably does most toward creating the Japanese effect in the structure is the roof arrangement, for the roofs, with their upward turn at the corners, are characteristically Japanese. Across the front and along one side of the second story there is an interesting balcony, sheltered by a broad roof of this design; and above this roof, like the top layer of a cake, is the third story with a roof of similar lines. The roofing is of a sort of asbestos composition, called "Malthoid," and is of grayish color, while the predominating color of the woodwork of the house is a dark olive green. This color scheme is very effective.

The masonry work, comprising the foundation, the front porch steps and the chimneys, is of brick and cobblestones, mixed, the latter showing only here and there, and serving to link the house with its surroundings.

Treatment of the Exterior of the House

The exterior of the first story is covered with sawed redwood shakes; the second story with split redwood shakes and the upper story has an exterior covering of shingles. The exterior of the house is stained with Pioneer shingle stain made by W. P. Fuller & Company, San Francisco, Cal. The framing and finishing timbers are of Oregon pine, undressed.

An arched bridge, leading from the hillside, provides access to the second-story balcony from the outside, and helps materially in creating the Japanese effect. Another feature of the exterior is the Japanese lantern placed at one side of the front steps.

The arrangement of the interior is, in a way, as unusual as is the character of the exterior. On the first floor are sitting room, dining room, kitchen and a screened porch; on the second floor are living room, a breakfast room, a butler's pantry, a bedroom and dressing room, and the bath room, and on the third floor are two bedrooms. The stairway to the second and third floors rises from the sitting room, and a dumb-waiter is used to connect the first-floor kitchen with the second-floor breakfast room. There are numerous closets and built-in features throughout the house, and in both the sitting room and living room are large fireplaces. Oak floors are used in the sitting room, dining room and living room. The dining room possesses a coved ceiling, while the ceilings of the other two principal rooms are beamed. A careful study of the accompanying floor plans, to better understand the arrangement of the interior and to note the various built-in conveniences, should prove especially interesting. In its appointments it is not only modern but very American.

The inside of the house is stained with Johnson's Wood Dye made by S. C. Johnson & Son, Racine, Wis., and with a branch at Los Angeles, Cal.

Hot water for the house is furnished by a Solar heater of such capacity as to provide an adequate supply for all purposes. It is made by the Night and Day Solar Heater Company, Monrovia, Cal. The cost of building this home, including the cobblestone retaining walls and all other garden architecture, was a little less than \$4,500. While it may not be of a style that can be unreservedly recommended, there are many plots of hillside ground on which a house of this kind can be

built with very satisfactory results. It possesses many admirable features both inside and out, and offers a suggestion for the designing of a home that gives the maximum amount of floor space from a limited ground area. More than that, it is a style that lends itself to picturesque surroundings and constitutes a truly picturesque home.

Increased Cost of Building in England

America is not the only place in the world where the cost of building has taken on a decided increase in the last few years, if one may judge from the recent report upon the cost of erecting school buildings in that country by the Elementary Education Sub-Committee of the Lancashire Education Committee. This report shows that there has been an increase of about 10 per cent. in most of the trades, and further increases are pending. In addition, the National Insurance Act is calculated to increase the cost of labor by from 2 per cent. to 3½ per cent., the actual amount depending upon the circumstances under which the labor is carried out.

The increased charges in connection with labor may be placed at about 12½ per cent.

The sub-committee submitted the following statement as to the average increase in the cost of materials in the past two years:

Average increase per cent.	Average increase per cent.
Common Bricks 14	General Ironmongery.. 18
Facing Bricks 9	Slates 7½
Glazed Bricks 12	Lead 30
Lime 10	Cast-iron Goods 60
Portland Cement 22	Copper Goods 20
Rolled Steel Joists... 23	Brasswork 23
Drain Pipes, etc..... 41½	Wrought-Iron Piping.. 30
Stone 10	Glass 30
Timber 30	White-lead 30

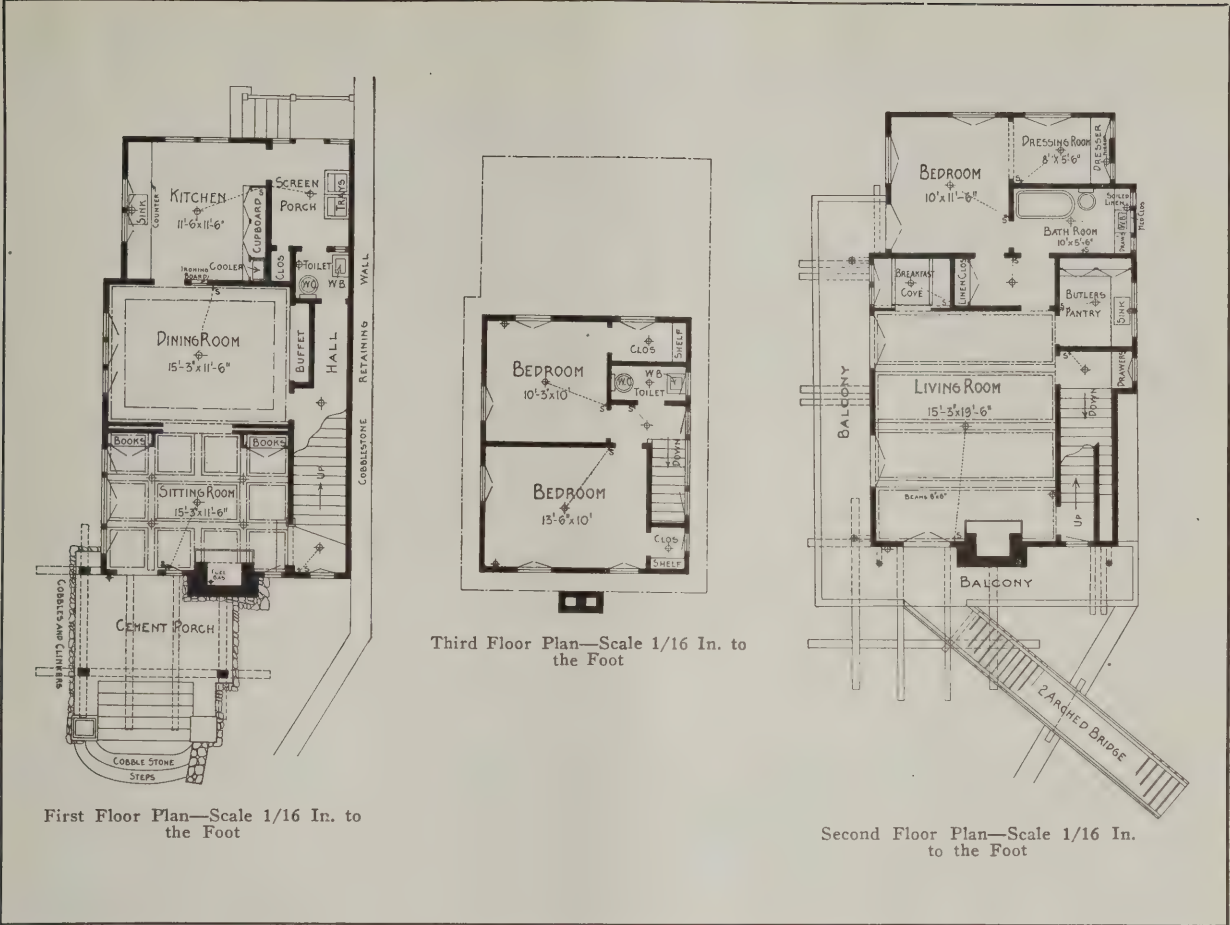
An Example of Unjust Specification Writing

What is described as an example of specification writing most oppressive and unjust to the builder is given in a recent issue of the *Monthly Letter* sent out by Secretary William H. Sayward, of the Master Builders' Association of Boston, and which states that the clause occurred in a recent contract for the execution of plans from the office of a well-known Boston firm of architects. The clause reads as follows:

"Whatever work may be specified and not drawn, or drawn and not specified, is to be executed as fully as if described in both these ways; and should any workmanship or materials be wanted which are *not either directly or indirectly denoted* in the specifications or drawings, but nevertheless necessary for the proper carrying out of the *obvious intention* thereof, the contractor is to understand the same to be implied and to provide for it in his tender as fully as if it were particularly described or delineated."

Mr. Sayward in commenting upon the matter says: "I consider such a clause as this improper from the fact that it is of a blanket nature, intended to cover the sins of omission of the architect. It is his business to determine what materials shall go into the building and in what way they shall be incorporated. It is, or should be, the constructing builder's affair to see that the wishes of the designing builder (i. e., architect) are carried out as expressed in his specifications and drawings. To make the builder a completer of the architect's specification by writing in his own ideas as to what the 'obvious intention' of the architect may be is to give him a most undesirable and illogical '*carte blanche*'. He will then be doing something which is not his business, and at the same time laying himself open to criticism from architect, owner, or others who come to view the completed work.

"Moreover, it works injustice to the competing bidders, for it places them on an unequal footing. If 'A'



A California House of Japanese Architecture—Another Photographic View of the House, Showing How Well the Japanese Style Blends with the Rugged Surroundings

conceives certain work or materials as necessary to fulfill the architect's 'obvious intention,' it by no means follows that 'B' will have the same conception. It is equivalent to offering different bidders sets of plans and specifications which are not identical, hence competition for the work will be palpably unfair.

"If it be contended that there are certain intricate details in respect to materials or construction about which the builder's knowledge would be more competent than the architect's, then the logical method would be, after conference with a suitably informed builder, to see that the details lacking are incorporated in the plans and specifications, thus placing all bidders on an equal basis and relieving each competitor from the necessity and burden of filling in the document according to his own sweet will."

Country Life Exposition

There is now being developed in the new Grand Central Terminal above the main waiting room and fronting on 42d Street a Country Life Permanent Exposition, the plan of which is to make this a point for all information in connection with country life. Among the features will be evolution of the country house; the department of house equipment and accessories, a model kitchen, a sportsmen's booth; also a department of house wares. We understand that a number of booths have already been laid out to represent the various municipalities of Westchester County. A bureau of information will be installed in which it will be possible for information to be procured on any subject touching on the country.

Tenement vs. The Cottage as a Dwelling Place

A problem which is present to some degree in every city of the country, existing wherever any portion of a population dwells under conditions dangerous to health, safety or morality, is that of housing the people. It is usually occasioned primarily by the lack of guidance in urban growth, by poor planning of buildings, faulty construction and defective sanitation. The result of bad houses is ill health, both physical and moral, and thereby industrial inefficiency, unemployment and a long chain of preventable social maladies which are very costly to the community and which place a heavy handicap upon individual and social achievements. This is a portion of the definition of the housing problem as contained in a very instructive report by E. P. Goodrich and George B. Ford, covering the problem of housing in Newark, N. J.

In a chapter devoted to the best type of housing for new areas, the authors ask and answer the question:

"What is the most desirable dwelling place, the tenement or the cottage? In the cities of the Northeastern States we have become accustomed to the tenement house and do not ordinarily question its social utility. There is scarcely a city in the country that is attempting in any well-considered way to eliminate the tenement house, yet there can be no question but that it is an undesirable place of residence for families with children. Even for the childless family the most expensive apartment house as well as the cheapest tenement may constitute an undesirable environment because of the facility with which diseases may pass from one apartment to its neighbor through the common hall and through the mediation of vermin, which pass easily from one suite to the other. Where people live in apartments also there is concentration of population and thus much traffic in the neighboring streets, which keeps the air full of dust and noise and thus renders apartment living unhealthful and unpleasant. The sounds

from neighboring apartments frequently make rest and quiet impossible. True privacy and solitude, though very important to the growth of the moral individual, are difficult to obtain. For the family with children the apartment is still less desirable. It becomes impossible for the mother of a family to choose her children's associates, to prevent her child from coming in contact with children or adults of unwholesome character who may reside within the same building. The mother cannot supervise the play of her child when outside of the apartment, and in general the atmosphere of the tenement or apartment house is one destined to create a race of adults that are unhealthful, puny, and, socially, highly artificialized.

In the cottage, however, it is possible to obtain all necessary privacy for true home life and personal development. The reduced dust of suburban communities and the larger penetration of sunlight make cottage homes healthier living places for infants and growing children. The mother of the family can supervise the play and the associates of her child in the garden. The adults of the family, if so inclined, can profit in health at least and some times in economy by cultivating a garden outside of working hours. The children gain the advantage and education that comes from daily contact with the things of nature, especially through the garden. It is probable, therefore, that at least for families with children, the suburban home is preferable to the tenement."

Automatic Telephone Exchange Buildings

What will constitute the first series of buildings of the kind ever designed especially for the exchange factor of automatic telephony, which requires a dry and even temperature and all possible elimination of dust particles, are about being erected by the Federal Telephone Company at Buffalo, N. Y. There will be eight specially designed fireproof buildings for the housing of one main exchange automatic switchboard and seven branch exchange automatic switchboards for the automatic telephone system which the company is installing in that city. The requirements will be met by a hermetically sealed building designed by Claude Ewing, chief engineer of the company, and H. J. Keer, of Buffalo. The buildings will each be two stories in height, constructed of hollow brick, hermetically sealed, with double walls, double skylights, double windows and doors, rounded corners to prevent all possible dust accumulation, and with slate between the ground and the flooring to act as an insulator.

The floors will be of concrete and the walls and ceilings will be of white enamel.

The air in the buildings will be changed completely from four to ten times an hour, and will be screened so that all dust particles will be arrested before the air enters the structure, thus affording complete protection to the automatic switchboards, as well as the very best of health conditions for the few employees required to supervise the operation of the automatic system.

The main exchange building will be located in Ellicott Street, near Huron Street, and the sub-exchanges in the Elmwood Avenue, Black Rock, Kensington, William Street, Central Park, South Park and Lackawanna districts.

K. F. Gill, of Cleveland, will have general supervision of the construction of the automatic switchboard work in these buildings.

One of the conspicuous features at the Panama-Pacific International Exposition to be held in San Francisco, 1915, will be the presentation of the latest methods of power development which have been evolved in recent years.

THE PHILIPPINE PROBLEM AND THE TRADE SCHOOL

Methods Employed and Results Obtained in the Effort to Americanize the Filipino by Means of Industrial Instruction

DID you ever undertake to teach a man anything? If so, you will remember that you knew a good deal more when you got through than when you started in. That is exactly the case with the United States in its more or less laudable efforts to prepare the Filipino for self-government. When the powder smoke had cleared away from Manila bay, and the civil authorities were told to go ahead and make good citizens of the Philipinos, they began to tackle an old problem from a new viewpoint. It was one thing to teach Sammie and Willie back home the things which father had learned—to follow in the groove of an educational system long established on orthodox lines—and another to go into a strange country to teach a Filipino boy the things which would do him the most good.

Somehow the problem assumed a crisp freshness which lent enthusiasm to the efforts of the men who at-

put a pupil through any very severe course of intellectual gymnastics when it is necessary to teach him a new language before he indulges in these exercises.

Other countries with educational systems long established on orthodox lines encounter almost insurmountable difficulties in the re-organizing of these systems upon a practical basis. In the Philippines, the Bureau of Education is hampered by no embarrassing precedents. It has reasonably ample funds with which to execute its plans and it has the moral support of both Americans and Philipinos in its attempt to build up a system of instruction which will promote the industrial efficiency of the population.

In solving their problem, those in charge of the work seem to have recognized the fact that a close distinction is necessary between the terms "manual training school" and "trade school." The former is an institu-



The Philippine Problem and the Trade School—Class in Woodworking, Sorsogon Provincial Trade School

tempted its solution. They began to dig down among the roots of the proposition, and in so doing they unearthed some fundamental principles which had grown rusty with neglect, but which, when cleaned off and polished up, have proved to be very effective implements in accomplishing the task at hand.

One of the principles was the idea that the best way to make a good citizen is to teach him to do some one thing, and to do it well; and this involved the selection of a line of work which would be commensurate with the degree of inherited mental capacity of the pupil. That the problem is being solved successfully is undoubtedly due partially to the fact that it is difficult to

tion devoting itself primarily, or at least largely, to the training of the hand as supplementary to the training of the mind. It develops a certain manual dexterity for the effect such training has on the mind and character of the student, rather than for the purpose of enabling him later to earn a livelihood; its aims are cultural rather than practical. The trade school, on the other hand, is established for the sole purpose of developing skilled workmen, and those in charge of the work of the Philippine Bureau of Education evidently believe that the trade school rather than the manual training school is the type of institution needed there.

The woodworking shops connected with the provin-

cial high schools are being organized and established as practical institutions upon a business basis. The industrial program is being promoted constantly through the medium of provincial industrial supervisors, inspectors and instructors from the traveling corps of the general office, through industrial exhibits, and by means of the special courses offered in the Philippine Normal school and the Philippine School of Arts and Trades. The last available figures on the subject show that, of the total enrollment of 235,740 boys and 138,842 girls in the Philippine public schools, 91 per cent were doing some form of industrial work. Twenty-one thousand boys were taking manual training and trade work; ninety-six thousand boys were engaged in school gardening and farming; fifteen thousand girls were also engaged in garden work; and one hundred and sixty-five thousand boys and sixty-eight thousand girls were taking up various lines which go under the general caption of minor industries.

Of the trade schools in the Philippine Islands, the largest is the Philippine School of Arts and Trades which was established in 1889 in Manila under the Spanish regime. This school had at one time a paper enrollment of 1,863 pupils with attendance unknown. Courses were given in carpentry, carving, masonry, ceramics, black-smithing, printing, shoe-making, tin-smithing, wheelwrighting and commercial branches. Originally the school was located in its own building, now remodeled and occupied by the Bureau of Printing, but the enthusiasm connected with its inception waned, and soon much of the enrollment and many of the courses were on paper only, and, before the days of American occupation, it was decided to close the school.

In 1901, when the civil government under Governor William H. Taft succeeded the military, under General MacArthur, the first American teachers in the Bureau of Education were already in Manila. The organic act providing for civil government made provision for the Philippine School of Arts and Trades and the School of Commerce, while the College of Finance was established in 1908. By these changes, the work formerly carried on by the Philippine School of Arts and Trades in an inadequate manner is now cared for by the Bureau of Printing, the Philippine School of Arts and Trades, the Philippine School of Commerce, and the College of Fine Arts, the last three institutions averaging 500 students each.

From 1901 to 1906 the Philippine School of Arts and Trades was housed in temporary buildings. Since that time it has occupied four of the city shops, to which it has been necessary to add four frame buildings.

The school is designed primarily to train young men who plan to follow a trade for a livelihood. No one is admitted without previously signing a written statement that it is his intention upon graduation to follow the trade pursued in the school. It is thus presumed that every person has a definite purpose in attending this school, and that he means business. As soon as it

is discovered that a pupil has not mechanical bent, or that he is not making the most of the opportunities, he is immediately advised to leave school.

Although a mooted question in the United States, the value of commercial work in the schools is not questioned in the Philippine Islands. An American trade school boy learns most of his trade after leaving school, while the Filipino boy, unless he comes from one of the two or three larger cities, must depend upon what he has learned in schools owing to the low state of mechanical development and the paucity of skilled mechanics in the provinces. One of the most valuable features, therefore, in the schools is the commercial work which is done not only for various branches of the government but also for private individuals. In a single year the return from this work has amounted to the sum of over \$17,000, which not only paid for all material and supplies consumed in the schools, but also allowed the employment of a great deal of student labor performed out of regular hours and during vacation periods, thus enabling many of the pupils partially to pay their expenses while attending the school.

The beginning work in all shops is confined to carefully graded exercises made from blue-prints. Even in this work exercises of practical value are given

preference over exercises of theoretical value and of doubtful applicability to real work.

After the first year the pupils are advanced in commercial work as rapidly as possible. Orders for a large number of single articles are not taken, and, as a result, the great bulk of the commercial work requires special designing, thus necessitating a great deal of preliminary work in the drafting department,

and preventing the possibility of a pupil having work which can be performed in a purely mechanical manner without continual mental alertness.

The American boy learns modern shop organization and business practice when he gets into the world. The Filipino boy with but few exceptions has not such opportunity, and it is mainly for this reason that an accurate cost accounting system has been introduced into the schools. For all commercial jobs, work orders are made out, labor is reported on daily time slips, materials are issued only by the storekeeper on properly executed requisitions, and tools are checked in and out by pupil tool keepers. Although emphasis is laid strongly upon the commercial work, and many features of modern shop organization are maintained, yet the use of carefully worked out exercises in the first year, the judicious intermingling of class and individual exercises, and the co-relation of the drawing and academic branches with the shop work, make a real educational institution, and not a factory with its usual attendant evils.

The work in arithmetic is based on practical problems which are submitted by the shop instructors, graded by the academic teachers and taught either in lieu of, or supplementary to, the regular texts. The problems cover various phases of all trades taught in the school, deal almost exclusively with articles and



The Philippine Problem and the Trade School—Dining Room Set in Red Narra, Made at the Philippine School of Arts and Trades

repairs pertaining to local conditions, and make use of current market prices and measures. In language work, phrases, sentences and paragraphs dealing with shop tools, materials and construction methods are encouraged. In addition to the common words found in the regular reading text, a spelling list of all shop tools, material and equipment used in each trade has been compiled and made an essential part in the curriculum. In reading, emphasis is placed on literature dealing with industrial subjects, for the purpose of not only widening the pupil's knowledge of the trade, but also of in-

and varnish, both brushed and rubbed, and in applying French polish or piano finish. The course in the fourth year includes estimating, hardware, shop methods, commercial work, practice teaching for those intending to become industrial teachers, and building construction for others. The following order is a sample of the practical work done from working drawings: One kindergarten table, two chairs for children, eight school desks, two dining tables, twelve washstands, two hat racks, five beds and two boards for weaving.

Six manual training centers in the city's schools are supplied with pupil teachers who teach under the supervision of the head of the wood-working department. The instruction in building work is confined mainly to the drafting department, but each year one or two full-sized frame buildings are erected by the class, thus affording practical demonstrations of the various problems connected with building.



The Philippine Problem and the Trade School—General View of the Provincial Trade School at Catbalogan, Samar

culcating the dignity of labor. The current newspapers and magazines are read in class to stimulate the reading habit and to enable the pupils to grasp the meaning of articles written in what is to them a foreign language.

The school day is divided into eight periods, four of which are devoted to shop work and lectures, three to academic classes, and one to drawing. The trade courses are as follows: Machine shop practice, wood-working, wheelwrighting, blacksmithing, ceramics, stationary engineering and automobile operation. Accuracy, neatness and patience—the cardinal virtues of a successful mechanic—are cultivated, and pupils showing themselves unable to acquire these habits are at once dropped from the course.

The woodworking department occupies two large shops. The department for first-year pupils is furnished with a full assortment of hand tools and double work benches. The other shop, in which the student works after the first or second year, depending on individual efficiency, is equipped with one Fay & Egan 26-in. planer, one Oliver hand joiner, one Fay & Egan circular saw frame, seven Putnam 10-in. lathes, two Putnam 18-in. lathes, one Fay & Egan 7-in. lathe, one Fay & Egan molding machine, one Oliver wood trimmer, one Fay & Egan band-saw, one automatic knife grinder, one power emery wheel, one automatic band-saw sharpener, and one 25-h.p. steam engine and boiler.

In the first year, instruction is given by short talks and long practice in the use, classification and care of tools, and a definite course is given in grinding and sharpening tools. All exercises are made from blueprints and special attention is given to learning the most important of the great varieties of native woods and their commercial uses. Toward the close of the year, repair work is undertaken, and simple pieces of furniture are constructed. The second year is devoted to woodturning and plain cabinet making. In the third year, emphasis is placed upon finishing and polishing. Each pupil is given experience in finishing in oil, wax,

cution of millwork arise from a misinterpretation of the lists furnished by the architect due to the ambiguity of the terms employed. More or less discussion of the matter has recently appeared in our columns, but in an article dealing with the subject of the uniform listing of millwork from sets of plans as furnished by architects, Charles Cloukey in a recent issue of the *National Builder* says:

"One might think it an easy matter for any number of mills to make lists just alike from the same plans and specifications, and considering the high class of workmanship employed in listing and estimating, it would seem that if the estimators are not able to get the same items on their respective lists there must be something the matter with the work of the architect.

"A long experience with the work of architects in

Uniform Listing of Millwork

Many of the annoyances in connection with the execution of millwork arise from a misinterpretation of the lists furnished by the architect due to the ambiguity of the terms employed.



Manual Training School at Laoag, Ilocos Norte

different parts of the country leads me to believe that a good share of the uncertainties encountered in making lists result from a peculiar attitude of the architect toward the work to be done by the contractor and his subs. We find in many cases the architect is indifferent about certain details and materials, and will not go to the trouble of minute specification. For instance, he may say that certain parts are to be made of pine and does not specify the quality, and perhaps the only clue to it may be found in the specification for painting and finishing which says that certain rooms are to be painted, certain rooms stained and certain others to be fin-

ished in the natural wood. One mill may figure a No. 1 common finish for the paint, clear sap for the stained work and clear for the oil, and then for fear he should be forced to furnish better stuff for the paint, he adds a small per cent. in the way of insurance.

"It is a common specification with an architect to say that 'all materials must be the best of their respective kinds.' Now, if the finish for paint had been specified No. 1 common or D stock every estimator and mill foreman would be free from doubt as to what was wanted.

"It is a common occurrence to find that the thickness of doors is not mentioned in a set of plans and specifications, and this leaves the estimator in much uncertainty; perhaps he will list all the outside doors $\frac{3}{4}$ and all the inside doors $1\frac{3}{8}$; perhaps another mill will call all of the inside doors 3 ft. wide and over $1\frac{3}{4}$. In case an architect specifies doors of 2 in. in thickness, one mill may list them as $1\frac{3}{4}$, while another will list them 2 in. and price them as $2\frac{3}{4}$ thick.

"Now, it is not expedient to multiply the record of a thousand and one instances where the estimators and listers come to a parting of the ways, for we who are interested in this matter know pretty well what they are. To place the responsibility for the trouble is another thing, and to bring about its practical abolition is decidedly still another.

"It is a fact that the mill men are not always blameless in the matter of modified lists, for some of them have been known to bill short in order to make a cheaper total and then agree to furnish only the stuff they had listed. This is a very old trick, and has been practised by retail lumbermen and mill workmen to such an extent that the live contractors now ask only for blanket bids, according to the plans and specifications.

How to Reduce Cost of Estimating

"It has been suggested that the architect furnish a complete list of mill work with his set of plans and specifications and so eliminate part of the expense of estimating. If it is a fact that 5 per cent. of the cost of mill work is represented in the making of estimates it would cut it down considerably if the work of listing could be sidestepped. Then, again, if the list furnished could be considered as absolutely reliable, the items added for uncertain 'miscellaneous,' which sometimes are as high as 5 per cent., could be eliminated entirely.

"The logical inference is that this would be a material saving for the builder, as the competition among mills would keep the price down in relation to cost. But let us see how it would work out in practice. In the first place, the architect would not do the extra work without an extra charge, and this would consume at least a part of the saving contemplated, if the professional services of the architect did not take it all up. Also, it is not reasonable to suppose that any assistant in the architect's office would be more liable to make a list of mill work free from error than would an estimator in the factory office. And, while such errors would not necessarily cost the mill man anything, they would cost the contractor or owner something, unless the loss could be recovered from the architect. In case the architect was held for the mistakes in listing, he would add a percentage to his charges to cover the same, just as the mill man does. If the contractor had to stand the loss of error he would also figure higher, and if the owner had to supply the shortages and make the changes it would cost him as much as it would if one of those already mentioned had included the extra percentage in their charge for material and service.

"It stands to reason that if a specification is so lax that a man of experience cannot tell what it means a mill work list made by the same office would be liable to lack in particulars of quality and detail, even if it was absolutely correct in sizes and quantity. This would mean delay or adding the extra per cent. to cover a possible and more expensive interpretation of the items.

"Considering the fact that mill work concerns find it necessary to make a charge for error, in spite of the fact that they employ the most expert help to be had for the purpose of listing, it is good logic to presume that no other branch of the building business can do better. And, arguing further from the fact that every party concerned will add a percentage for error where he is held to the correction of mistakes, we are led to believe that the owner is the man who ultimately has to pay for the mistakes of the various individuals who do his work. There are specific instances where gross error falls upon some division of the work in such manner that it cannot be shifted, but put in the general term of per cent., the owner is the man who is forced to pay.

"Now, what do we learn or how can we benefit from the above analysis of this subject? Is there any way by which some of the work of estimating may be eliminated? We can say yes to this, but we are not so certain when asked if any of the cost can be cut out.

"If the mill work lists were made in the architects' offices and sent out with the plans for blanket bids the mill would have to verify the list and that would save little, if any, time. If the list were considered correct and only the details were sent along to enable the mill man to price the articles listed, the responsibility as well as the work would be thrown back on the architect's office, and the only possible question of saving would lie between the architect's charge for this service and risk, and the listing of the material by half a dozen more or less of mill work estimators.

"If the average cost of estimating mill work amounts to 5 per cent. of the business secured in that way, it arises from the fact that the mills figure on four or more plans to every contract they land. There seems to be no remedy for this as long as the mills are in open competition, and the only saving to them would be the work of taking off the quantities from the plans.

"As far as the contractor is concerned, it is practically useless to expect him to make lists of mill work, and if they all did it there would be about as much work involved as now, and we are forced back upon the alternative of the mill and the architect. Perhaps some ambitious as well as able architect will set the good example of furnishing complete and guaranteed lists of mill work with his plans, so that others may thereby be forced to do likewise! However, if he ever does put out a list of mill work we will see this note in some conspicuous place on the printed heads: 'Any discrepancy occurring between this list and the plans and specifications covering the same must be reported to the architect for correction before proceeding with the work!' And would a list like that be a help to any party concerned?

"Perhaps more can be done in the mill office to cut down the cost of estimating than at any other point, if the architect will but do his part in making his plans, specifications and details of such a character as may be read and interpreted without doubt and delay."

Opening of New York Vocational School

The classes in the free evening trade school for men and boys in the Vocational School conducted by the Department of Education, Fifth Avenue and 138th Street, were opened September 15. The work includes instruction in plan reading, estimating, carpentry and joinery, drafting, plumbing, mathematics, blacksmithing, electric wiring and installation; trade mathematics, including arithmetic, use of symbols, geometry, trigonometry, and English, under which is included the writing of specifications, drawing of contracts, writing business letters, etc., etc.

The evening sessions are held four nights a week, Monday to Thursday evenings, inclusive. The sessions begin at 7:30 and close at 9:30 o'clock.

DWELLING HOUSE WITH MOVING PICTURE THEATRE

A Country Home in Which Are Provided Unique Features of Amusement During the Long Winter Evenings

ONE of the latest developments in the way of a private dwelling with amusement features has recently been completed at Shippan Point, a beautiful peninsula extending from the Connecticut shore for a distance of more than a mile into the waters of Long Island Sound. It is very generally recognized nowadays that a great deal of the comfort, luxury and pleasure which the city affords must in most cases be abandoned by the seeker of the pleasures of nature and of an environment afforded by a residence in the country. One of the most difficult things to secure in the country is some means of amusement for the long evenings of the fall, winter and early spring months—something that one has been accustomed to in a well-appointed apartment in the city misses very keenly.

Of course this question has been solved to a very fine degree by the wealthier members of the suburban colony, who long ago built their homes with splendid music rooms, squash courts and other features of con-

siderable size. One end of the house, is 20 ft. wide, about 35 ft. long and is two stories high, extending from the basement up to the second floor.

The stage, which is separated from the amusement hall by folding doors, is a continuation of what may be described as an inside porch and all the space above 6 ft. from the ground is entirely enclosed with glass. An idea of this may be gathered from an inspection of the half tone engraving representing a general view of the house as it appears when looking toward the water. The two-story effect is seen at the right hand of the picture at the rear. The stage runs back 10 ft. and extends the entire width of the room. This space may also serve as a conservatory, and it is for this reason that two stories of glass doors as shown in the picture were installed. When used as a conservatory the stage may be shut off from the rest of the theatre by accordion doors extending to the ceiling.

Another part of the porch is used as an outside break-



Front View of Dwelling House Having Moving Picture Theatre, with the Waters of Long Island Sound Seen in the background

venience and pleasure, but the problem to make all these things available in a house of moderate price has been solved in a most unique manner by the dwelling referred to in the opening sentence of this article.

The building is in fact a combination of dwelling and moving picture theatre, the latter being so arranged that it can be used as a concert hall, a squash court, a gymnasium or a ballroom, according to circumstances, for it is provided with all the necessary requirements for these various purposes. Beneath the stage, which is 2½ ft. above the main floor of the room, there has been left space for the storage of camp chairs, gymnasium paraphernalia, of stage lights, etc. The theatre, as will be seen from an inspection of the floor plan, takes in

fast room and has a tile floor. A large section of the conservatory can be thrown open, giving a very pretty view of the flowers when the family use the outside porch for dining purposes. The porches and terraces have cement floors and the piers in the outer wall of the breakfast room are made of 4 x 4 in. studs trussed over the arches. The breakfast room portion of the porch is steam heated.

The doors opening from the breakfast room into the living room are of the casement type.

The dining room, which is on the first floor and is an alcove, so to speak, of the living room, is carried out a few feet over the theatre floor, as shown in one of the half tone views presented herewith, something after

the manner of a theatre box, so that the family or guests may be able to enjoy the music or be in touch with anything that may be going on in the theatre.

The floor is of yellow pine brought to a polish resembling glass. The trim is Mission oak.

It will be seen from an inspection of the floor plan that the space is divided at the left of the large living



The House with Moving Picture Theatre as Viewed from the Water Side

room into a kitchen, which is in the left front corner of the house, a servant's room with bath and a commodious pantry which establishes communication between the kitchen and the living room.

The house is built of hollow tile covered with cement plaster and the roof is Spanish tile of a moss green color.

The lower stories of the house are square, but the upper story is "T" shape; an arrangement which provides two porches on the second floor—one over the theatre and the other over the front porch for out-door sleeping.

There are four bath rooms in the house and the heating throughout is by steam.

Although the theatre is the unique feature of the house, it is by no means the only one incorporated by the owner and designer, Frederick P. Fox, Shippan Point, Stamford, Conn., and with New York office at 140 West 40th Street. At the other end of the house is a garage which is under the porch that faces Long Island Sound.

In the basement are shower baths and dressing rooms for those members of the family and guests who wish to take a dip in the salt water of the Sound, which is less than 100 ft. away.

Apprentice or Student?

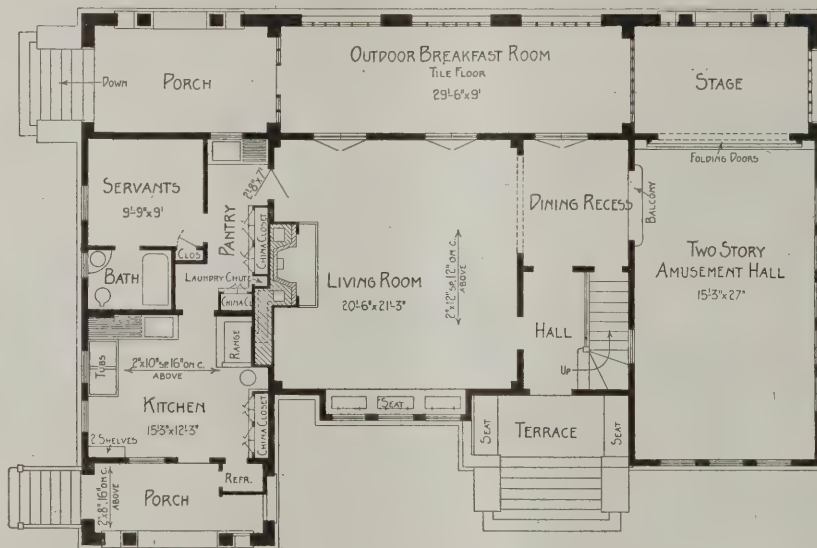
At about this season of each year the question of training for a professional career is discussed by educators, anxious parents and occasionally is given a thought even by the incipient professional man himself, says the *American Architect*. To a young man just out

of high school who looks upon the profession of architecture as offering opportunities for a life of usefulness the following question inevitably presents itself: Can he hope to achieve the fullest measure of ultimate success as an architect by apprenticing himself to a man of brilliant achievement, or should he preferably pursue a four-year course of study within the walls of an educational monastery?

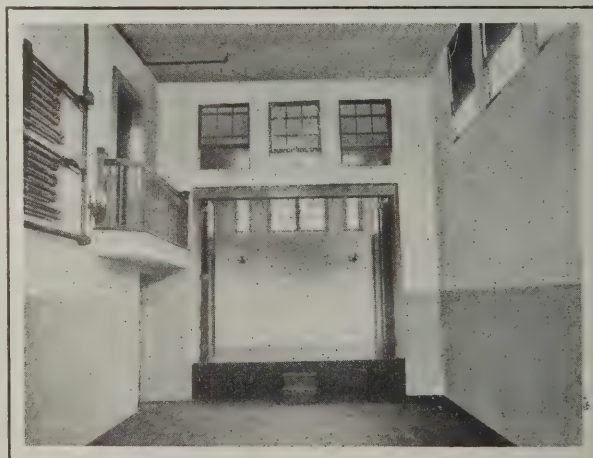
The apprentice system, which was formerly the only means of acquiring technical knowledge, is even at this day being urged by some. With a logic most frequently adopted by those of advanced years, who are still living in the past, its champions claim that since the best work of the past has been produced by this system, and as much modern work is incomparable to the "old masters," therefore the old system must be the better. Furthermore, the reactionaries, asserting that architecture should be the natural self-expression of the nation producing it, believe that this end is thwarted by the present system of architectural training—that to con the Parthenon, the purpose of which was utterly foreign to any present-day institution, and to reassemble its dry bones in an effort to create structures breathing the life of the present, is to court failure.

The academicians, on the other hand, hold that the successful architect of the future is the high school

graduate who in his formative period applies himself for four years exclusively to the work assigned by professors of undoubted ability in the theory of their respective departments. They claim that the solution of purely theoretical problems, if well chosen, is more beneficial than the humdrum, somewhat mechanical routine that for



Plan of Main Floor—Scale 1/16 In. to the Foot



View in Amusement Hall Looking Toward the Stage

years is the lot of the untrained office assistant. A school problem involving many of the principles of practical work may be solved in a comparatively short time by the student, and he profits as much in the large essentials as though he had spent a hundred times as much labor in actually laying out the

work with its many time-consuming changes, repetitions and alterations. In justifying the study of work foreign in purpose to that of present needs, it is claimed that these old masterpieces embody the principles of good construction and decoration and of refinement,

why so large a number of small houses were being constructed with brick exteriors instead of frame, as in the past, and questioning the economy of brick construction, made the following statement, says a late issue of *Brick and Clay Record*.

"There is a belief in the minds of a great many people that brick construction costs from 40 to 50 per cent. more than frame construction. Experience and investigation, however, have shown this belief to be a fallacy. The large number of brick residences that have been built during the last year have done much to establish the fact that brick is really the best material for the economical builder to use.

"And investigation of the costs of building materials with the aid of an architect will prove both interesting and instructive, especially when the brick construction is compared to the cost of frame construction. In frame construction, labor is employed in seven different instances, namely: (1) The studding, which forms the frame of the building; (2) the sheathing, (3) the building paper, (4) the weather board-

ing, (5) the lathing, (6) the plastering, and (7) the painting, which requires three coats to get good results. In brick construction, but two processes are necessary, (1) the brick work and (2) the plastering.

"Carefully compiled statistics show that the actual cost of brick walls over frame varies from 15 to 40 per



Dwelling House with Moving Picture Theatre—View in Outdoor Breakfast Room Looking Toward the Stage

principles that are universal and not merely national. To teach the application of these principles to present-day requirements is the endeavor of the school.

Certainly there are points in each of these methods—the apprentice and the academic—which appeal to the impartial observer. The former system is really a survival of the times when all present-day professions were regarded as trades, when the truths of art and science were as yet uncoded. But the failure of many graduates from professional schools to meet the requirements of practical work has gained a hearing for the reactionaries who advocate a return to the apprentice system.

The deficiency of a purely theoretical training seems obvious and the remedy so comparatively easy to apply that we wonder all architectural schools, instead of a possible few, have not taken advantage of it. In a four-year course there are three vacations, each of about four months' duration. If even half of this time each summer were required to be spent in such practical work as was available, the benefit to the student would be great. The intention would be not simply to make the student's services an immediate financial asset upon his graduation, but to give him such an insight into the application of his studies that he would be stimulated to their fuller understanding and appreciation while pursuing them.

Relative Cost of Brick and Frame Houses

Not long since an architect in one of the cities of the central west was asked by a prospective home builder



View in Dining Recess Looking Toward the Balcony

cent., depending largely on the price of the face brick selected. As the walls of any building cost only about 10 per cent. of the total, brick construction would add only from 2 to 4 per cent. to the total first cost of the building. As it is necessary to repaint a frame dwelling every few years, it will readily be seen that brick construction, besides being the best, is the cheapest.

CHICAGO BUILDERS HOLD ANNUAL "OUTING"

A Most Delightful Visit to "Starved Rock," Illinois, Well-Known for Its Rugged Scenery and Historical Associations—Some Pictures Incident to the "Outing"

IT was an ideal spot, well known for its historical associations and wonderful scenery in its immediate vicinity, which was selected for the sixth annual outing of the members and guests of the Chicago Builders and Traders Exchange, held Saturday and Sunday, September 20 and 21. It was most unfortunate that miserable weather attended the start and remained throughout the first day, but, nevertheless, the entire party accepted the adverse conditions with good grace and heartily co-operated in carrying out what proved to be a most attractive and diversified program.

A special train on the Rock Island Railroad conducted the party to Joliet early Saturday morning, and from there the remaining 53 miles to Starved Rock, Ill., were covered by interurban cars. The "Rock"

were more violations than recognitions of the program.

The Sunday program included an excursion to Deer Park and a launch ride along the picturesque Illinois river. The canyons of the former provided food for considerable discussion as to their formation and the sight of seeing trees growing almost horizontally and perpendicularly from a bed of rock called for many astonished murmurings. Two parties made the river trip and explored the Horse Shoe Canyon, returning in time for the excellent repasts that were provided.

Refreshments en route and at the "Rock" were entirely gratis. For the men cigars and the necessary drinks were always in abundance, while the ladies and children were regaled with candy. Each tripper was also provided with a sanitary drinking cup. The re-



Chicago Builders Hold Annual "Outing"—Scene in Devil's Eye Cave with Its Reflecting Pool

was reached shortly after noon, and the dinner that awaited the hungry and chilled delegation was most acceptable and gratifying. Sight seeing and the visiting of historical points were the scheduled activities for the afternoon, and as pedestrians, explorers, climbers, woodmen, etc., everybody acquitted themselves in most appropriate style. Supper was attacked at 6 o'clock with unusual vigor as a result of the strenuous afternoon meanderings.

The after-supper proceedings were conspicuous by the absence of speeches and the formation of a Ladies' Auxiliary, at which ladies only were present, with the exception of President John D. Corlett. Arrangements for future meetings were made and the following officers appointed: Miss Mae E. Duffin, president; Mrs. J. Kratz, vice-president; Miss Shoemaker, secretary, and Mrs. George Henrich, treasurer. Music, dancing and card parties consumed the remaining time, and while "hitting the hay" was scheduled for 10.30, there

turn trip was commenced after supper on Sunday evening and Chicago was reached in good time.

Throughout the trip President Corlett was the personification of genial hospitality and was conspicuously considerate when the comfort and enjoyment of others were concerned.

Secretary Hendricks, J. T. Kilroy, O. W. Jovien, F. S. Shoemaker, H. D. Jenkins, J. J. Walsh, C. W. Jones and many others were able assistants to the president.

The following committees were also active at all times, and the "outing" will be recorded as one of the finest and most successfully conducted in the history of the association.

Outing Committee.—A. Y. Reed, chairman; O. W. Jovien, John Sunderman, C. W. Jones and F. S. Shoemaker.

Reception Committee.—F. F. French, J. J. Walsh, E. B. Perkins, C. P. Paschen, J. J. Kratz, J. C. Cala-

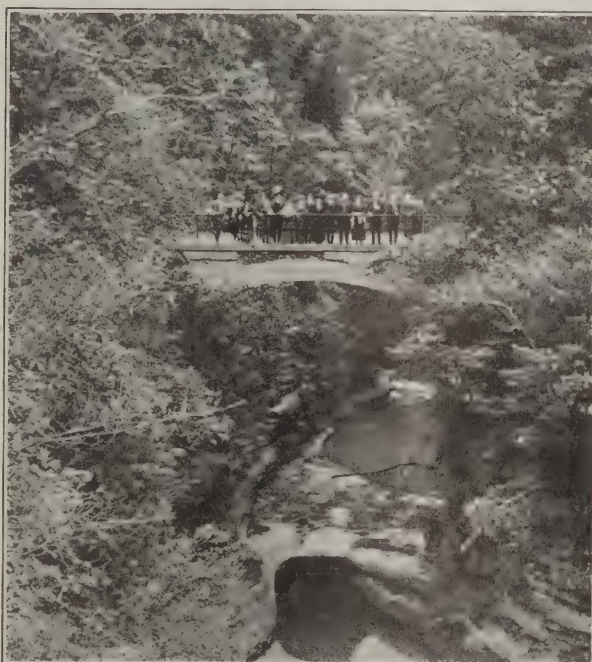


A Group of the Visitors Backed Up Against the Rocks in Horse Shoe Canyon

han, A. C. Jaeger, C. J. McKeon and C. H. Wright.

The picture first shown represents some of the party at Devil's Eye Cave; the second picture shows a group backed against the rocks in Horse Shoe Canyon; the small picture in the center of the page is a scene in Deer Park, while the last picture is a group outside of Devil's Eye Cave.

The Panama Canal Commission has arranged for an extensive plant to be operated in the Canal Zone for the purpose of manufacturing hollow tile for the construction of the permanent buildings in the new city of Balboa,



A Scene in Deer Park with the Visitors on the Bridge 200 Ft. Above the Man with the Camera

being built by the government to take the place of the older Spanish towns.

The arrangement has been made with the Concrete Stone & Sand Company, of Youngstown, Ohio, and A. A. Pauly, inventor and patentee of the Pauly concrete hollow tile machinery.

One of the largest building developments planned for what is known as the Rockaway section of Queens Borough, N. Y., is about being commenced and is estimated to cost nearly half a million dollars. The buildings will be of the bungalow type and erected after Edison's idea of the "poured" concrete house.



Some of the Visitors as They Were Caught by the Camera Just Outside Devil's Eye Cave
Chicago Builders Hold Annual "Outing"—Some Incidents of the Visit to "Starved Rock"

A HOUSE OF HOLLOW TILE WITH STUCCO FINISH

A Country Home of Pleasing Design in Which the Tile Roof Is
a Noticeable Feature—Some Figures of Cost

THE subject of our cover design this month is a country house with walls of hollow tile, stucco finish and an interior treatment which cannot fail to command the attention of interested readers. Among the noticeable features are the long sweep of the roof with its many hips and valleys, and extending down to cover the front porch in the manner indicated by the perspective on the front cover.

An inspection of the floor plans on the facing page shows the stair case so positioned as to be well lighted by four windows in the end elevation of the house, while the open fireplaces in the living room, dining room and front bedroom permit of the cheerful log fire to take off the chill of the early spring and late fall days when the full heating system is unnecessary.

The foundation walls and piers are of concrete mixed in the proportions of one of cement to three of sand and five of broken stones, which will readily pass through a 2-in. ring.

It is intended to construct the main walls of the first story of 8-in. hollow tile and those of the second story of 6-in. hollow tile. All window heads are to be reinforced with iron rods and concrete filling and all corners are also to be reinforced.

The chimneys, of which there are two, are to be of hard burnt common brick set on a concrete bed.

The outside sills are to be constructed of a heading course of dark red tapestry brick, and a footing course of the same material is to run around the base of the walls as shown on the elevations presented on the opposite page.

The front porch is to be set in 9 x 9 in. square Moravian tile of a rich red color, while the mantel hearths are to be set in 6 x 6 in. square tile.

The entire exterior walls as well as the chimneys, etc., are to be covered with a rich coat of stucco with sand finish and a light cream yellow in color.

The hung-gutters and leaders are to be of No. 24 galvanized iron with neat leader heads. All tin, including gutters and leaders, are to be painted both sides before setting with metallic paint and pure linseed oil. The sheet metal work except the hung gutters and leaders is to be of I. C. Charcoal roofing tin.

The floor beams, rafters, ridge plates, etc., are to be first quality spruce. The roofs, dormers, etc., are to be covered with 7/8 x 8 in. sheathing boards over which building paper is to be placed and this in turn covered with shingle tile. The studs for all interior partitions are 2 x 4 in. The floors are to be double, the rough flooring being 7/8 x 8 in. tongued and grooved material and the finish floors of first quality maple blind nailed and given a good coat of boiled linseed oil. The interior trim is of chestnut.

The walls and ceilings of the various rooms are plastered with three coat work applied directly to the hollow tile walls. The rooms of the first floor have a sand finish except the kitchen, pantry, etc., which have a hard finish. The rooms of the second floor have a sand finish colored with pigments and the closets have a hard finish.

All outside trim, doors, sash, etc., are to have three coats of paint. The interior woodwork and trim of the first floor rooms are to be stained and varnished and second floor interior woodwork is to receive three coats of white enamel paint rubbed to an egg shell gloss.

The house is piped for gas and wired for electricity,

the pipes and wiring being run before commencing plastering or laying the flooring. The main gas intake is 1 1/2 in., the main riser 1 in., the branch runs 3/4 in. and the branches to outlets 5/8 in.

Iron outlet boxes are to be placed at all outlets for electric fixtures and circuits controlled by simple pattern slate base knife switches. The fixtures are to be of the combination pattern.

The plumbing fixtures are to be porcelain of the latest pattern and the necessary compression bibb cocks, stop, overflows, etc. The bath room floor is to be laid in square white tile on a cinder concrete bed. The walls are to be wainscoted in tile and finished with a neat cove, base and cap.

It is the intention to heat the house by hot water, all pipes to be of standard weight wrought iron.

An estimate of the cubical contents of the house and unit price is as follows:

	Cu. ft.
House, 28 x 33 x 23 ft. high.....	21,252
Cellar, 20 x 28 x 5 ft. deep.....	2,800
	24,052

A unit price of 21 cents per cubic ft. gives a total cost of \$5,050.92.

The architect states that this estimate is based upon prices prevalent in the vicinity of New York City, which can be called high when compared with most sections of the country.

Cost of Labor and Material

The cost of labor and material of important parts of the work is as follows:

Excavating	\$60.00
Grading	40.00
Masonry	1,452.30
Concrete and cement	360.00
Plastering	345.00
Carpentry and mill work.....	1,511.00
Painting	157.50
Plumbing	306.00
Heating	260.00
Metal work	95.12
Tile work	196.00
Mantels	48.00
Gas and electric work.....	160.00
Hardware	60.00
	\$5,050.92

The country house here shown was designed by Frank B. Fellner, architect, care of *The Building Age*, or 413 Caton Avenue, Brooklyn, N. Y.

Licensing of Architects in the District of Columbia

A bill providing for the licensing of architects and regulating the practice of architecture as a profession in the District of Columbia has been prepared by the Washington Chapter of the American Institute of Architects, and we understand it is the present intention to introduce it at the coming session of Congress.

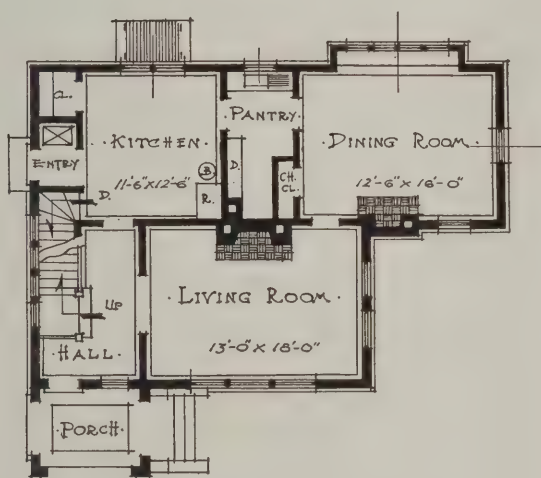
What is said to be the most expensive wood in the world is "cabole," a beautiful tree belonging to the mangrove family of plants. It is a native of the west coast of Africa and when sawed into boards has the appearance of teak wood. It is at present used only for making high grade furniture and objects of luxury. It is said to have sold as high as \$3,500 per cubic meter.



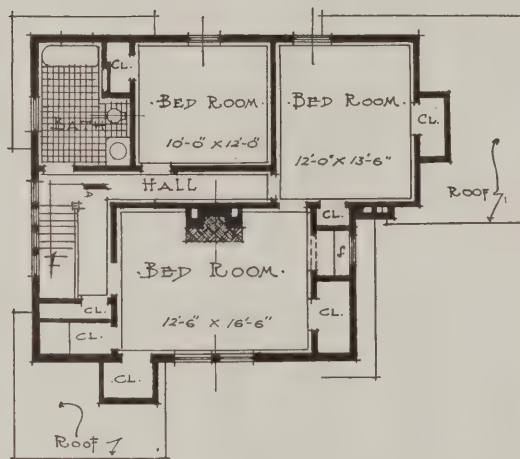
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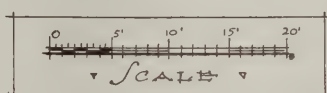
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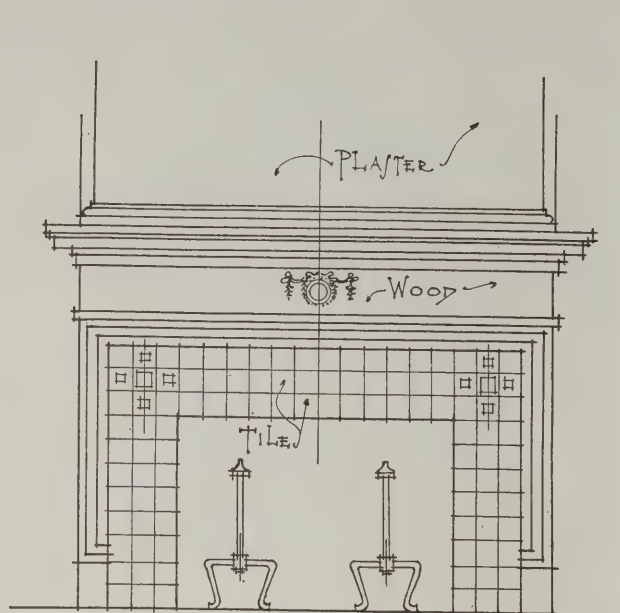
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▼ REAR · ELEVATION ▼



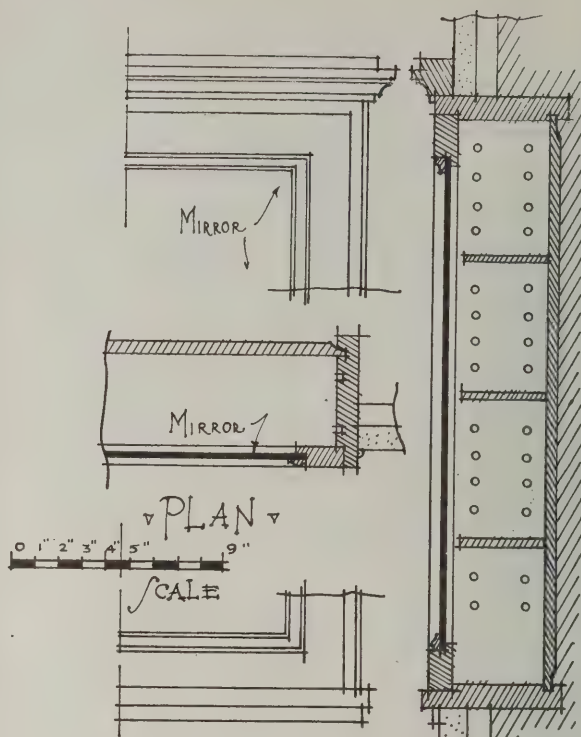
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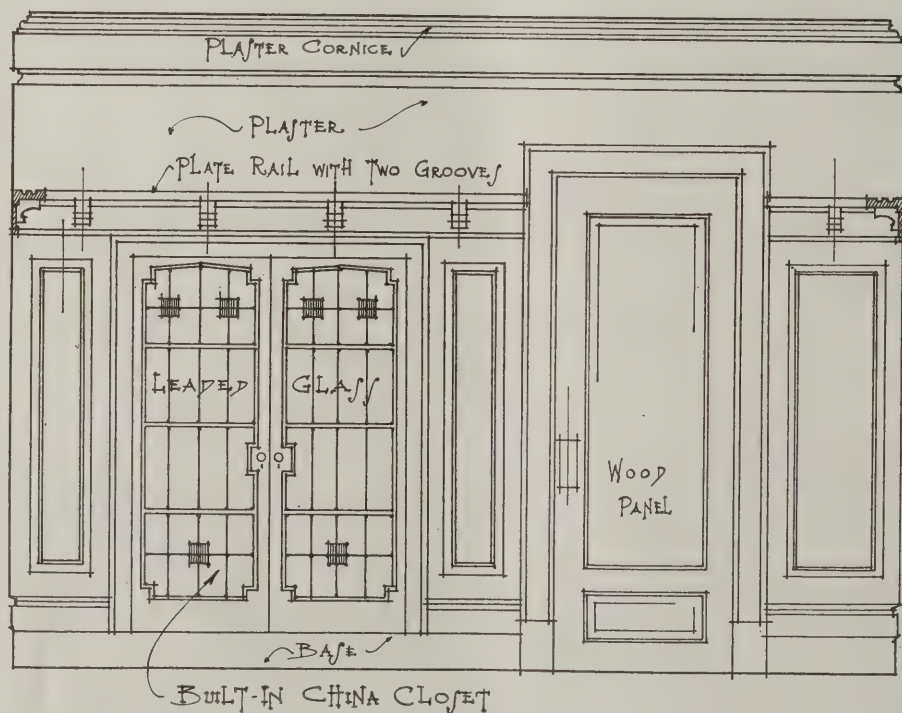


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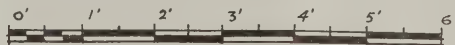


▽ ONE-HALF ELEVATION · ▽ SECTION · ▽

▽ MEDICINE CLOSET · ▽



▽ ELEVATION · IN · DINING · ROOM · SHOWING · CHINA · CLOS. · ▽



▽ SCALE ▽

HOISTING RIGS FOR THE BUILDERS' USE—II.

Measuring Size of Rope—Its Weight and Strength—The Windlass—
Its Style and Power—Chain Slings and Hooks

By EDWARD H. CRUSSELL *



HAVING done our best to explain a method for computing the power of the tackle we will now turn our attention to the rope, or cordage, as the manufacturers term it. It may be well to mention at the outset that there are two ways of measuring the size of rope—by the circumference and by the diameter. When ordering rope from a distance, or when specifying rope for any purpose, care should be taken to make it plain which measurement is intended. Instead of saying, "Send me 500 ft. of 2-in. rope," say 500 ft. of rope 2 in. diameter; otherwise you may get 5/8-in. rope instead of 2 in.

In Fig. 5 is a table giving the weight and strength of new manila rope. The breaking strain shown in the table is not as great as some manufacturers claim for their products, but it is much better to be sure than

Diameter, Inches	Circumference, Inches	No. of Feet in one Lb.	Breaking Strain in Lbs.	Weight per Coil, Lbs.	Length of Coil, Fathoms
1/2	3 1/2	50	479	25	208
3/4	4 1/4	33	784	40	220
1	4 3/4	25	992	40	166
1 1/4	5 1/2	19	1,224	65	205
1 1/2	5 3/4	14	1,762	70	165
1 3/4	6 1/4	10	2,400	80	135
2	6 3/4	7 1/2	3,135	100	125
2 1/4	7 1/4	6	3,968	125	125
2 1/2	7 3/4	5	4,896	150	125
2 3/4	8 1/4	4 1/2	5,927	180	125
3	8 3/4	3 3/4	7,054	208	125
3 1/4	9 1/4	3	8,278	240	125
3 1/2	9 3/4	2 3/4	9,600	282	125
3 3/4	10 1/4	2 1/2	11,020	322	125
4	10 3/4	2	12,540	375	125
4 1/4	11 1/4	1 3/4	15,870	462	125
4 1/2	11 3/4	1 1/2	19,592	562	125
4 3/4	12 1/4	1 1/4	21,600	625	125
5	12 3/4	1 1/2	23,704	700	125
5 1/4	13 1/4	1 1/4	28,213	800	125
5 1/2	13 3/4	1 1/4	33,110	933	125
5 3/4	14 1/4	1 1/4	38,400	1,125	125
6	14 3/4	1 1/4	44,084	1,200	125
6 1/4	15 1/4	1 1/4	50,157	1,500	125
6 1/2	15 3/4	1 1/4	56,622	1,636	125
6 3/4	16 1/4	1 1/4	63,480	1,800	125

Fig. 5—Table Showing Approximate Weight, Length and Strength of Manila Rope

sorry. The breaking strain should be divided by four for the safe working load and the reader is requested to note that the table gives the strength of new rope, the strength of second-hand rope being an unknown quantity. Once a hemp rope has been strained to near the breaking point it has been permanently damaged, and while not many men will take chances with a suspended load, there are plenty who will strain a rope to the breaking point when drawing a load along the ground and thus weaken a rope that is almost new.

There is a point in connection with the use of rope in pulley blocks that it may be well to explain. The safe load that can be lifted with a rope threaded twice or more times through pulley blocks is just that number of times greater than the safe load for a single line.

For example: Suppose the rope in Fig. 4 to be 3/4 in. in diameter, the table shows the strength of this

rope to be 3968 lb., dividing by 4 gives us 992 lb. as the safe working load for a single line. In Fig. 4 there are four lines leaving one pulley block and five leaving the other, which gives the ultimate safe load for the tackle as either 3,968 lb. or 4,960 lb., according to which way the tackle is arranged. The arrangement of the tackle makes no real difference to the strength of it. The point to be realized is, 992 lb. on the fall line ex-

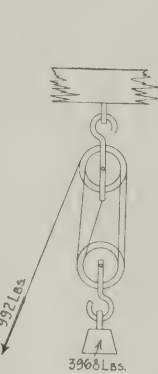


Fig. 6—Showing Safe Working Load for Single Line

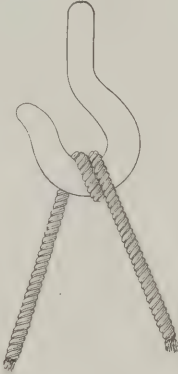


Fig. 7—Method of Placing Rope on Hook



Fig. 8—A Better Method of Arranging the Rope



Fig. 9—The First Step in Forming the Hitch Shown in Fig. 8

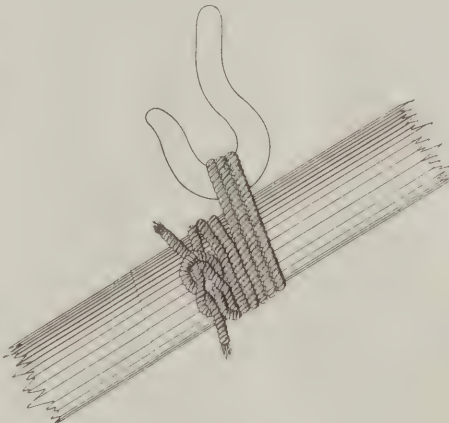


Fig. 10—Position of the Hook When Lifting the Load

Hoisting Rigs for the Builders' Use—II

erts a force of 4960 lb. on one pulley block and 3968 lb. on the other and this is so, no matter which one be attached to the load.

Fig. 6 should make this perfectly clear, for it is surely obvious that the upper block must be supporting the combined weight of the load and the power on the fall line, or a total of 4,960 lb., although the load to be lifted is only 3,968.

In the same manner a rope that is doubled and tied or spliced together so as to form a sling is twice as strong as a single line, though it should be placed on the hook, as shown in Fig. 7, to secure its full strength, the short kink in the rope where it passes over the hook making it weak at that point. A better method yet, especially where, as is often the case, we wish to make the distance between the hook and load as short as possible, is shown in Fig. 8. This is sometimes called a "catpaw," but its proper name is "racking

*Copyright 1913 by Edward H. Crussell.

hitch." It is made by first forming two bights in the rope, as shown in Fig. 9, and with one in each hand rolling them over and over from you until all the slack of the sling is taken up, when they are placed together on the hook.

The rope used for slings should always be larger than that used in the tackle and even then it is often necessary to pass it several times around the load to obtain sufficient strength.

Where this is necessary a single line is better than a sling. It should be passed the required number of turns around the load and fastened with a reef knot. In lifting, the hook of the tackle is passed through half of the turns, leaving the others to grip the load, as shown in Fig. 10.

Hemp rope slings for heavy lifts are seldom used, except in temporary work or in emergencies. Where much hoisting is done special gripping devices, on slings made of wire rope or chain are used. Wire

Size	Proof Test, Lbs.	Average Wt. per Ft., Lbs.
1"	1,200	.9
1 1/8"	2,500	1.22
1 1/4"	3,500	1.6
1 3/8"	6,200	2.5
1 1/2"	9,600	4.2
1 5/8"	13,800	5.9
1 3/4"	18,800	7.9
1 7/8"	24,600	10.2
2"	29,500	12.7
2 1/8"	36,500	15.8
2 1/4"	44,000	18.8
2 3/8"	52,500	22.2

Fig. 11—Table of Close Link Chain

Diameter in inches.	Approximate circumference in inches.	Approximate weight per foot.	Approximate strength in tons of 2000 lbs.	Proper working load in tons of 2000 lbs.	Diameter of drum or sheave in feet advised.
2 3/4"	8 3/4"	11.95	211	42.2	11
2 1/2"	7 7/8"	9.85	170	34	10
2 1/4"	7 1/2"	8	155	28.6	9
2"	6 3/4"	6.90	106	21.2	8
1 3/4"	6 1/4"	5.55	96	19	8
1 1/2"	5 5/8"	4.85	85	17	7
1 1/4"	5"	4.15	72	14.4	6 3/4"
1 1/8"	4 5/8"	3.55	64	12.8	6
1 1/2"	4 1/4"	3	56	11.2	5 3/4"
1 1/4"	4"	2.45	47	9.4	5
1 1/8"	3 5/8"	2	38	7.6	4 3/4"
1 1/4"	3 1/2"	1.68	30	6	4
1 1/2"	3 1/4"	1.20	23	4.6	3 3/4"
1 1/8"	3"	.89	17.6	3.5	3
1 1/4"	2 5/8"	.62	12.5	2.5	2 3/4"
1 1/8"	2 1/4"	.50	10	2	2 1/4"
1 1/4"	2 1/8"	.39	8.4	1.68	2
1 1/8"	2 1/4"	.29	6.5	1.30	1 3/4"
1 1/4"	2 1/8"	.22	4.8	.96	1 3/4"
1 1/8"	2"	.16	3.1	.62	1 1/4"
1 1/4"	1 3/4"	.10	2.2	.44	1

Fig. 13—Table of Wire Rope*

hook, which is of square section and so formed that it may be hooked into any part of the chain, shortening it and forming a loop for the hook of the tackle. B shows the hook that is passed around the load. It is round in section and of such size as will slide easily along the body portion of the chain, thus forming a slip loop that will grip the load. A large ring, through which the grab hook may be passed to form a loop, is sometimes used instead of hook B.

Wire ropes have almost entirely superseded hemp ropes where there is much hoisting or hauling to be done, and while they are really outside the scope originally intended for this series, it has been thought well to include the table shown in Fig. 13 for the purpose of comparison and reference. The table of chain blocks given in Fig. 14 is inserted for the same reason.

The speed of a chain block is governed by the pull required on the hand chain and the distance the hand chain must travel to lift the load the required distance.

Chain blocks are not much used in the erection of the modern building, though they often perform important work in the installation of machinery fixtures after the building is erected. There is one place, however, where the builder can employ them to advantage and that is in the line of alterations and repairs. The table, Fig. 14, gives the specifications and power of three different kinds. They have many advantages

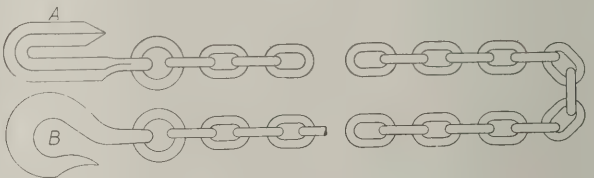


Fig. 12—Chain Sling Showing Styles of Hooks Most Commonly Used

Capacity in Tons	PULL in Pounds required on Hand Chain to Lift Full Loads			Feet of Hand Chain to be Pulled by operator to Lift Load One Foot High			HOISTING SPEEDS Feet per Minute Attainable and No. of Men required for Hoisting Full Loads without pulling over 80 Lbs.										LOAD ONE MAN CAN HANDLE without pulling over 80 Lbs.		
	Triplex			Duplex			Triplex			Duplex			Differential			Triplex	Duplex	Differential	
	Full Load	Half Load	Quarter Load	No ^s of Men	Full Load	No ^s of Men	Full Load	No ^s of Men	Full Load	No ^s of Men									
1/4	62	68	72	21	40	18	8	16	24	1	4	1	6	1	1000	1000	500		
1/2	82	87	126	31	59	30	4	8	12	1	2	1	3.70	3	2000	1700	800		
3/4	110	94	246	35	80	36	4.8	9.6	14.4	2	2.40	2	2.50	3	2300	2500	1000		
1	120	115	308	42	93	42	3.6	7.2	10.8	2	1.80	2	2.30	4	2500	2700	1100		
1 1/4	114	132	557	69	126	38	2.3	4.6	6.9	2	1.10	2	2.30	7	4000	3300	1000		
1 1/2	124	142	84	155	155	155	1.7	3.5	5.2	2	.80	2	2	10	5000	4600	1000		
1 3/4	130	145	126	195	195	195	1.3	2.6	3.9	2	.65	2	2	15	6500	5300	1000		
2	130	145	126	252	252	252	1.1	2.2	3.3	2	.50	2	2	20	7000	6500	1000		
2 1/4	135	160	168	310	310	310	.8	1.6	2.4	2	.35	2	2	25	9000	7800	1000		
2 1/2	140	160	210	390	390	390	.6	1.2	1.8	2	.30	2	2	30	11000	10000	1000		
2 3/4	130*	160*	126*	480*	480*	480*	1.1	2.2	3.3	4	1	1	1	1	13000	10000	1000		
3	135*	160*	168*	570*	570*	570*	.8	1.6	2.4	4	1	1	1	1	17000	10000	1000		
4	140*	160*	210*	680*	680*	680*	.6	1.2	1.8	4	1	1	1	1	20000	10000	1000		

* On each of the two hand chains. † The number of men is based on each man pulling not over 80 lbs. One man pulling 160 lbs. or less, as given in the first two columns can lift the full capacity of any Triplex or Duplex Block.

Fig. 14—Table Showing Hoisting Speeds and Specifications of Chain Blocks*
Hoisting Rigs for the Builders' Use—II

rope slings are not spliced into a loop like hemp rope, but are formed of a single rope with special hooks or thimbles at the ends.

When heavy loads of small bulk are suspended from these single line slings, something should be done to prevent the load revolving. Under severe strain there is a chance of the rope untwisting sufficiently to permit the strands of the splice to pull apart. Where there is any possibility of this it will be best to use the slings in pairs.

Short lengths of chain provided with the proper hooks or rings make excellent slings and are very much stronger than the average workman has any idea. A table showing the proof test strength of short link chain is given in Fig. 11. The size given is, of course, the size of the bar from which the link of the chain is made, not the over-all size of the chain. The safe working load should be one-half the proof test.

In Fig. 12 is shown a chain sling with the styles of hooks most commonly used. At A is shown the grab

hook, which is of square section and so formed that it may be hooked into any part of the chain, shortening it and forming a loop for the hook of the tackle. B shows the hook that is passed around the load. It is round in section and of such size as will slide easily along the body portion of the chain, thus forming a slip loop that will grip the load. A large ring, through which the grab hook may be passed to form a loop, is sometimes used instead of hook B.

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over the ordinary pulley blocks, one of which is not always fully realized. With the chain blocks a man can, in an emergency, exert a force on the hand chain equal to his own weight, because of the blocks holding the load automatically while he changes hands and also while he stops to rest if necessary. With the pulley blocks nothing like this is possible. The workman must hold the load all the time and when reaching for a fresh grip must hold it with one hand so that a weight requiring a pull of 30 or 40 lb. on the fall line makes a very full load if it is to be raised a considerable distance. When several men are pulling on the tackle this difficulty is usually overcome by snubbing the end of the line round some stationary object so as to enable them to change hands without having all the weight fall to one or two of them.

Probably the best method of applying man-power to a tackle is by means of a winch or windlass, especially where the load is to be hoisted. The old-fashioned well windlass is one familiar form, a modification of

*John A. Reibling's Sons Co. *Yale & Towne Mfg. Co.

which is shown in Fig. 15. This is a home-made rig and the drawings show its construction quite clearly. The spindle or shaft is of square section rounded off where it enters the bearings. The ends of the shaft are tapered to fit the crank sockets and then rounded and fitted with thread and nut to prevent the cranks slipping off. The drum is made in two sections, fitted carefully to the shaft and fastened together with countersunk bolts. It is made with a concave surface so as to accommodate a greater length of line. In use two or three turns are taken round the drum with the fall line of the tackle and one man pulling on this line

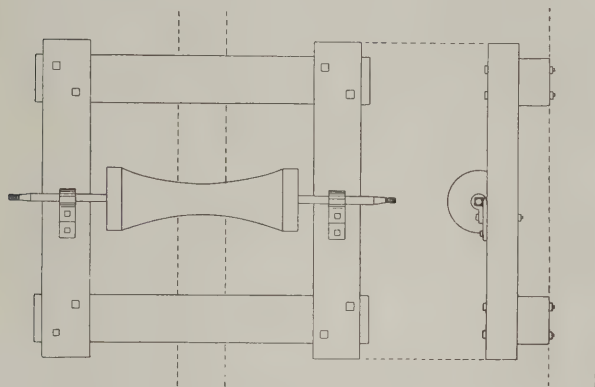


Fig. 15—Some Details of a Home Made Windlass

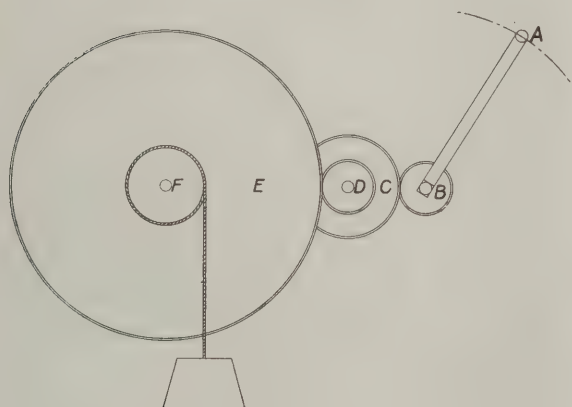


Fig. 17—Diagram for Computing Power of the Apparatus Clearly Shown in Fig. 16

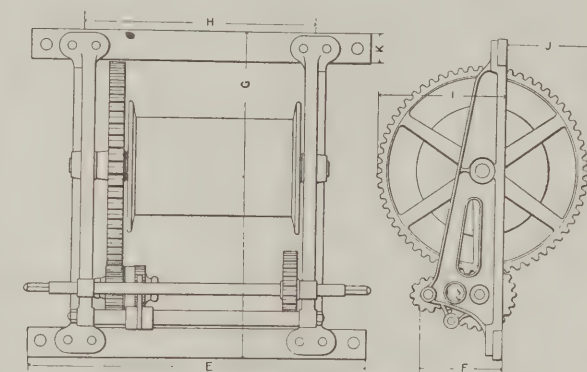


Fig. 16—Style of Winch in Common Use by Contractors

No. of Winch	E			F	G	H			I	J	K
31	30 1/4"	36 1/4"	42 1/4"	3 3/4"	24 1/4"	18 1/4"	24 1/4"	30 1/4"	9 "	5.26"	2 "
32	39 5/8"	45 5/8"	51 5/8"	9.95"	26 "	25 1/8"	31 1/8"	37 1/8"	11.2"	5 "	2 "
33	39 "	45 "	51 "	9.8 "	38 5/8"	27 "	33 "	39 "	14 7/8"	9 7/8"	3 1/2"
35	43 3/4"	49 3/4"	55 3/4"	12.8"	47 "	31 3/4"	37 3/4"	43 3/4"	17 7/8"	11 7/8"	3 1/2"

Table Showing Dimensions of Winches*

Hoisting Rigs for the Builders' Use—II

will cause it to grip the drum sufficiently to hold more than several men can raise.

With a cylindrical drum the foregoing is not possible because the turns will not slip back to the center, and as soon as the line has worked over to one side, it begins to coil up on the drum. Where only a short lift is to be made this is of little consequence, but for greater lifts the amount of line coiled up will soon increase the diameter of the drum to such an extent that the power will not be sufficient to handle the load.

The power of the apparatus in Fig. 15 is computed as in the first rule given for the pulley blocks, viz.: The power multiplied by the distance through which it moves, is equal to the load multiplied by the distance through which it moves. In Fig. 15 these distances are proportional to the radius of the circle described by the crank handle and the radius of the drum.

Therefore: Multiplying the power by the distance from the center of the crank handle to the center of the drum and dividing by the radius of the drum will give us the ultimate force exerted by the apparatus.

Example: Suppose the crank handle radius in Fig. 15 to be 18 in. and the diameter of the drum at the center 4 in., what weight can be lifted with a force of 50 lb. at the crank?

$$18 \times 50 = 900$$

$$900 \div 2 = 450 \text{ lb. Ans.}$$

Or to put it differently, what force will be required at the crank to raise a weight of 360 lb. on the drum? In this case the power multiplied by 18 must be equal to 360 multiplied by 2.

$$360 \times 2 = 720$$

$$720 \div 18 = 40 \text{ lb., which is the answer.}$$

Fig. 16 shows the style of winch more generally used by the contractor for hoisting purposes. It has a train of wheels and the method of computing the power of it can best be shown by means of the diagram, Fig. 17. If the radius of the crank circle A is 16 in., of the wheel C 4 in. and of E 12 in.; if the radius of the drum F is 3 in., of the pinion D 2 in. and of the pinion B 2 in., how great a weight can be lifted on the drum with a force of 10 lb. at A? This may be figured as in the case of the simple windlass, multiplying the radius of A by the power and dividing by the radius of B; multiplying the radius of C by the answer and dividing by the radius of D, and so on to the end. But the easiest way is to multiply the

power and the radii of A, C and E together and divide by the radius of F multiplied by D multiplied by B.

Solution:

$$10 \times 16 \times 4 \times 12 = 7,680$$

$$3 \times 2 \times 2 = 12.$$

Then the weight that can be lifted with a force of 10 lb. at A equals $7,680 \div 12 = 640 \text{ lb. Ans.}$

The reader will notice that crank shaft in Fig. 16 is not fitted with thread and nut, and from this may conclude that the thread and nut on the shaft of Fig. 15 is unnecessary. It should be explained that the winch in Fig. 16 is fitted with a ratchet and pawl which holds the load at all times and if one of the cranks slips off it as an easy matter to replace it. If a crank was to slip off the rig, shown in Fig. 15, while a load was being hoisted there would be a good chance for accidents. The cranks of Fig. 15 could be welded solid to the shaft if desired, but if they are made separate some method of fixing them securely should be employed.

The Cape Institute of Architects of South Africa are agitating the question of the licensing of architects.

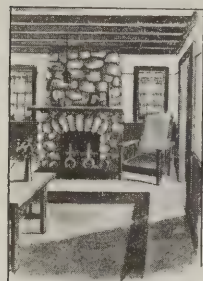
*The Brown Hoisting Machinery Co.

INTERIOR DECORATIONS FOR COVER DESIGN

Suggested Color Schemes for the Various Rooms with Hints Regarding Furniture, Floor Covering and Wall Treatment

BY ANNA L. MOFFATT

A MOST attractive country home constitutes the cover design for this issue of *THE BUILDING AGE*. The rooms on the first floor are unusually well arranged, allowing quite independent treatment in each room. The woodwork here is given a brown oak finish; the staircase, which is so conveniently arranged, is of oak, as are also the floors. The fireplace is of Gruebe tile—light brown with a small green design. I would cover the walls of the living room with a green fabric paper called Griffin cloth.



With this I would use a cut-out border in tones of brown, green and rose. This is an imported paper, and sells for \$1.50 per 30-in. roll.

For the floor, I would use a large rug in two tones of green. Madras casement curtains, having a small pattern, will look well at the windows. A heavy cretonne in autumn colorings will do for over-draperies.

The furniture should be informal in character. One or two upholstered pieces. These may be done in cretonne, same as hangings. A willow chair, stained a gray brown, cushioned in cretonne; an oak table in simple lines; a small tea table with cretonne cover under glass tray will be an effective note here. I would have a lamp with large Japanese shade, having straight lines with wisteria coloring. On the casement window sill I would place several small pots of pink begonias. The effect will be a charming room with a harmonious and attractive ensemble.

The Dining Room

Here the wall space is given a two-third panel treatment, in a Dutch brown stain. The upper third is a soft yellow, almost cream. I would place a rug here in two tones of tan; at the windows Madras curtains same as in living room will be excellent. Across the top of each casement window an 18-in. valance of Dutch brown cotton rep' will give a quaint effect. The contrast here will be derived from the fireplace, which is of Dutch blue tile. The furniture should be antique oak, and simple in design. The brown tones will form a wonderful background for the decorative china which may be placed on the plate rail. The color scheme here is a most attractive one, and will wear well.

Bedroom No. 1

As the wall spaces here are not large, I would suggest a plain paper in light tan, almost cream. This may have a narrow stencil border in light tones. For the floor covering here, I would use several small Scotch rugs, in tan and white. I would curtain the windows with simple muslin curtains, having overhangings of unbleached cotton. These may have stencil border same as wall covering, and should be hung each side of casement window with valance between.

For furniture here, there may be a white enamel bed, mahogany bureau and small table. One or two comfortable chairs, and with the mantel, which is beautifully simple in design you will have a delightful and comfortable room.

For the second bedroom I have in mind a paper that

sells for 30 cents a single roll. It has a gray background, with small diamond pattern in blue and pink. At the windows I would have muslin curtains same as other rooms on this floor. I would cover the floor with two or three small gray cretonne rugs. These may have a pink border at each end, and with gray painted furniture you have here a dainty room at small cost.

Bedroom No. 3

I would suggest for the walls of this room, yellow paper. This will tend to brightness, and will be harmonious with the hall, which is done in tan. The rug here should be a light brown, and with white furniture you will have a bright and attractive guest room.

I cannot imagine a more delightful country home than this house, well placed, with a path which winds gracefully by a clump of flowering shrubs or perhaps an old tree.

The New Pan-American Building

Rapid progress is being made in connection with the new building for the Pan-American States Association and the site most favored is said to be that of the large plot of ground on Seventh Avenue between Thirty-second and Thirty-third Streets, New York, facing the Pennsylvania Railroad Station. The site consists of a vacant plot 200 ft. by some 400 or more ft. in depth and more suitably meets the requirements of the plans than any other which has been considered, owing to its central position and because it better fits the design of the structure for which a large plaza with a massive outside staircase is provided by the architect, Francis H. Kimball, of 71 Broadway, New York City.

The new skyscraper, which will be 901 ft. in height, will be one of the most wonderful pieces of architecture in the world, and will over-top all habitable structures, being 150 ft. higher than the Woolworth Building, which is now the tallest.

It may not be without interest to state that the building will contain the most extensive and commodious club rooms, library, information and translation bureau in the world. The main section of the building will have 32 floors with 23 and 25 ft. ceilings. The remaining floors up to the apex of the structure form a series of towers rising to the full height.

The 21 million cubic feet of material required will come in large part from Latin-American countries. The design of the structure is of Spanish architecture.

Lectures on Interior House Decorating

A course of lectures on "The Theory and Practice of Furnishing and Decorating" is one of the interesting features of the program which has been mapped out for the winter at the West Side Young Men's Christian Association in New York City. In addition to the lectures there are to be practical demonstrations in the principles of color, form and pattern. The work includes a study of "historic periods" and their causes and effects in architecture, furniture, floor covers and other decorative expression. The course is being conducted by Frank Alvah Parsons, president of the New York School of Fine and Applied Art.

A LOG CABIN TYPE OF STUDIO BUILDING

An Interesting Example of Log House Studio Occupied by an Artist of International Reputation as a Painter of Children in Country Life

IN the suburb of Hubbard Woods, about twenty-five miles from Chicago, is a log house of such proportions that a presentation of some of its more important features will no doubt prove to be of unusual interest to many of our readers. The building is situated in the midst of a forest of oak trees and is barely perceptible from the street on which it faces. It is owned by Adam Emery Albright, an artist who has established an international reputation as a painter of children in country life.

Aside from the features that surround its construction, it is surprising to state that the building was erected without the aid of blue prints, the only working plans used being charcoal drawings prepared by the artist himself. Besides being his own architect, Mr. Albright was his own builder, superintendent, and

not less than 20 ft. high, resting on a concrete foundation, with a wall 10 in. thick. The studio, measuring 32 ft. long by 48 ft. wide, lacks the second story that is noticeable in the house.

In building the house it required 270 logs of Oregon pine secured from northern Wisconsin, each 60 ft. long and with diameters ranging from 10 to 14 in. Naturally the question arose as to how the logs were to be raised and fixed securely in place. It was necessary to erect a derrick 58 ft. high with a boom of the same length, use being made of 1000 ft. of 1½-in. rope.

Before hoisting the logs into position it was necessary to cut grooves about 18 in. from each end so that when the ends crossed they would remain in a firm position. After this was done, spikes, 10 in. long



Log Cabin Type of Studio Building—Designed and Occupied by Adam Emery Albright of Hubbard Woods, Ill.

all other official capacities it would be natural to assume in the construction of a log house of such proportions. Aided by six men on the average, the residence and studio took Mr. Albright about six months to erect. Only three contracts were awarded—those for the heating, plumbing and lighting. The remaining constructive necessities were bought as required and were installed in a manner entirely satisfactory to the amateur builder and owner.

The structure is built in the shape of the letter "H," the left wing being used exclusively as a studio, and the right wing as a residence. The section joining the two wings is used as a reception room, and from here a broad stairway leads to the upper regions of the house proper.

The entire structure is 84 ft. long, 48 ft. wide and

and ½ in. square, were driven in to make everything secure. From the photographs reproduced herewith it will be seen that there was considerable space left between the logs after they were placed in position. To make the building entirely free from drafts the spaces were chinked with pieces of wood of various sizes, reinforced with oakum caulking. Thirty-eight bales of oakum were used for the latter operation, and on top of this was plastered a mixture of lime, sand and cement, both inside and outside the building, thereby keeping out any possibility of draft. This has proved effective in operation for the past two years, and it is the opinion of the owner that the materials will remain in their present condition for many years to come.

A characteristic feature of both sections of the

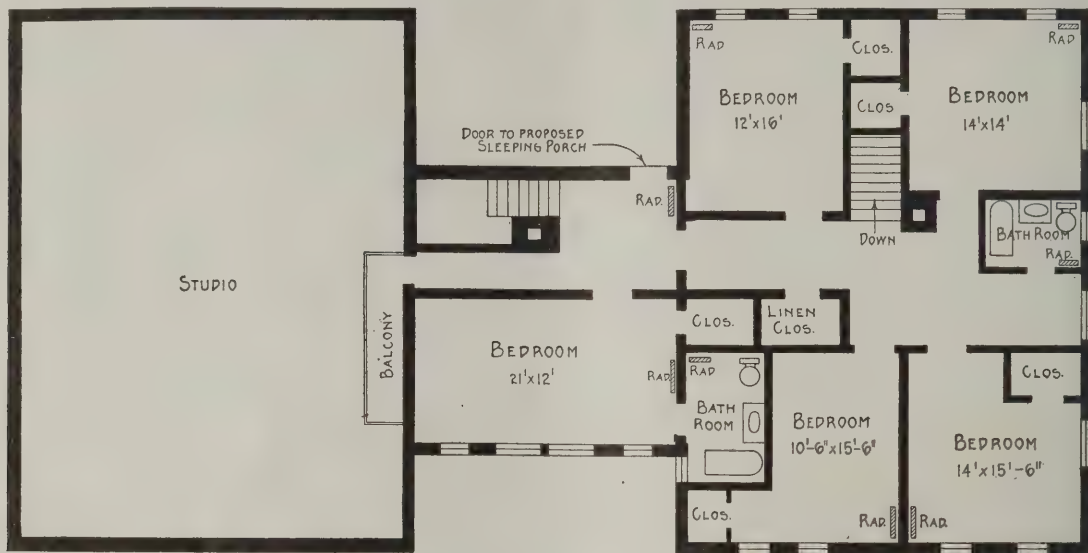
house is found in the splendid natural lighting arrangements and it is probably no exaggeration to say that there are practically no dark corners in any part of the building. This is especially true in regard to the studio, where the north side of the room is almost entirely of glass.

The interior finish in both the studio and the reception room is the same as that of the exterior. In the house there are nine rooms, the main floor having a living room, dining room, library and kitchen. On the second floor there are five bedrooms. The living

a high polish. Quite a number of the doors have glass panels, those leading to the living and dining rooms being double.

The visitor on entering the building through the reception room is at once impressed with the conspicuous originality that is noticeable in many ways. A photograph showing a corner of this room depicts the oak stairway leading to the bedrooms, with the old English fireplace and the artistic tiled hearth just at the right.

The fireplace is constructed of old clinker bricks of



Second Floor Plan, Showing the Upper Space of the "Studio"—Scale 1/16 In. to the Foot



Main Floor Plan, Showing Relative Position of the "Studio" to the Other Rooms—Scale 1/16 In. to the Foot

A Log Cabin Type of Studio Building

and dining rooms are artistically finished in brown, the oak wood used being entirely harmonious with its surroundings. The remaining rooms have the walls plastered and the ceilings whitewashed.

All floors are double, a rough felt paper being used between for deadening. In the studio the top floor is of maple. The reception room and upper part of the house have floors of sawed white oak, hard pine being used for the first floor in the house. The interior trim throughout is of 1¾-in. oak, finished with

all shapes, sizes and colors, arranged in an artistic manner. The grate is about three feet wide and two feet deep, the top of the fireplace having imbedded in it a hook and chain, on which may be hung kettles, etc. Seats are provided at each side, also constructed of clinker bricks. The tiling in front was completed according to the owner's ideas and blends with the multi-colored fireplace in the most approved manner.

The stairway is built of heavy blocks of oak, hewn to a size about 4 ft. long, 1 ft. wide and 6 in. thick.

Each slab is securely supported on rough timber, this being hidden from sight by oak boards nailed at the sides. Right above the turn is a large window, which throws an abundance of natural light into the reception room and effectively lights the stairway. This is especially necessary, as there is no provision for artificial light with the exception of a gas lamp situated near the entrance. To add to the quaintness of this room candles are used for receiving guests.

It will be seen from the floor plans that the stairs to the cellar are under those leading from the kitchen to the second floor. At the top of the stairway a large linen closet is immediately noticed, and each bedroom also has a spacious closet. There are two bathrooms equipped in the most up-to-date manner, one being in the owner's room and the other in the passageway for general use by other members of the family. All plumbing fixtures are of a type manufactured by the Wolff Manufacturing Co., Chicago, Ill. A short passageway to be noticed on reaching the second floor from the reception room leads to a 16-ft. balcony which overlooks the studio.

From the owner's bedroom the construction of the

graph of the studio leads to a rear porch. This is a cement platform, about 24 ft. square, used mostly as an outside studio. It is the intention of the owner to erect a sleeping porch directly above this porch and this will be reached by a doorway that has already been provided for in the passage on the second floor. This same porch can also be reached by a doorway leading from the reception room at the right side of the fireplace all as clearly shown on the plan. The porch, too, is convenient to the library.

Artificial light is supplied both by gas and electricity. In the studio, a quadruple gas fixture provides light when occasion demands. The first-floor rooms in the house have electric lights of the indirect type, while the library and bedrooms have ceiling and wall brackets connected to the electric light installation.

The heating throughout is supplied by the "Broomell" system of vapor heating, invented by the Vapor Heating Co., Philadelphia, Pa., the system being installed by Thomas J. Douglass & Son, Chicago, Ill.

In each of the living rooms low type of radiators are installed, while in the reception room and studio the regular type of high radiator has been provided.



Detail of Corner Construction



Interior View in Studio Looking Toward the Open Fireplace and Showing Balcony at the Right at Level of Second Floor
A Log Cabin Type of Studio Building

roof can be noticed through two large French windows which overlook the reception room entrance.

The shingles used throughout are of split oak, each 30 in. long, 5 in. wide, exposed 24 in. to the weather. They are not waterproofed, but are laid in double courses over a matched roof, which is covered with a layer of "Neponset" waterproofing building paper. No gutters are provided for drainage purposes, there being sufficient coping to enable all drippings to drop to the ground without running down the walls.

The doorway to be seen in the corner in the photo-

The furnace used is a "Spencer" No. 13B, manufactured by the Spencer Heater Co., Scranton, Pa. The heating apparatus rests on a concrete floor in a spacious basement. Only the south section of the ground has been excavated, though at that there is considerable space left for the owner and his sons to do carving and general woodworking on a bench fitted up for that purpose.

A number of minor improvements have yet to be made to render the house entirely satisfactory to the artist-builder. However, with the ideal surroundings

that are essential to an artist of Mr. Albright's temperament, he feels perfectly satisfied that his unusual venture justifies his expectations.

Waste in Bidding on Contracts

The subject indicated by the above title is one which has often been the basis of much discussion in the trade, but the topic has by no means been exhausted. One of the latest contributions to the literature dealing with the present unsatisfactory and highly expensive method of figuring construction work is an article in Cottrell's Magazine, extracts from which we present herewith:

Most of our economic waste is due to a lack of a definite knowledge of costs in our industries.

For instance, you have a building project and you call in seven or eight contractors all of the same general class to submit proposals on the work. There will be a difference of 30 per cent. between the highest and lowest proposal, and all of which means that costs in this industry are largely a matter of opinion.

With costs only as a matter of opinion, the building public has no confidence that one man's judgment represents the lowest market price, so a group is called in to spend their time and money in making an estimate, and with no reward—only the hope of reward.

All this is wasted effort with them all, save the successful bidder.

Very few people realize what it costs to make estimates on building projects, even though the basis of an estimate is not a matter of definite knowledge.

Take a courthouse or city hall, say one costing \$5,000,000, exclusive of the heating, plumbing and decorations.

It will cost each general contractor who submits a proposal \$5,000 in traveling expenses and the labor of estimators.

Say there are eight contractors figuring on the work. This means that through a lack of confidence, which

the owner may know the lowest market price, is a gigantic total and a frightful economic waste.

It has only been within the last few years that there has been any organized effort among building contractors to determine absolutely costs in the detailed operations of building, and with the same certainty and accuracy that the typewriter, adding machine, auto-



A Detail of the Roof Construction



Log Cabin Type of Studio Building—A Corner in the Studio Showing Open Fireplace, Etc.

has been created in the public mind by a lack of definite knowledge, a debt of \$40,000 has been accumulated, which society, somewhere, somehow, must pay.

With smaller building projects the cost of making estimates is very much higher in percentage, double in some cases, and when we consider all the estimating of all the building of the United States in a year, the amount expended in both money and effort, in order that

mobile, and low-price watch manufacturers know their detailed costs.

This organized effort for cost finding has only been with the very large contracting organizations, and is of little value because they have the unfair competition of those who do not know their costs.

The average contractor in the average city has no definite knowledge of the cost of a cubic foot of brick work, a square of floor, a yard of plastering or of putting on inside trim, fitting such and hanging doors.

The average knowledge of building costs is inherited—the present generation got their present basis of prices from their fathers or their former employers under whom they learned their trade.

These prices have been increased in percentages from

time to time as material and labor prices have increased, but no doubt the original basis of them was wrong.

The average contractor's bookkeeping, together with his cost keeping, is so indefinite that he does not know until a contract is completed or until the end of the year, or until he goes out of business, or dies, whether he has made any money or not. He may make money

on one operation and lose it on another, or on one contract and lose it on another; he gets too much for one operation or one contract and not enough for another.

Then comes the moral effect of a lack of definite knowledge of costs. The shrewd owner finds that costs are a matter of opinion, and he at once undertakes to



Log Cabin Type of Studio Building—Detail of the Wall Construction, Showing How the Spaces Between the Logs Were Filled with Pieces of Wood Before Calking

change that opinion by applying horsebuyer methods in order to get his building as cheap as possible; the contractor in turn takes this as a moral license to "trim" the owner at every point, even to the extent of slighting the work. The owner comes back with bonds, forfeitures and iron-clad contracts, all of which are childish, for no one can make a man do good work if he hasn't the free will with a profit as an incentive to good work. The building contractor has not made money in the same sense as other industries involving the same skill and capital.

The solution of this evil is in very simple local organizations of contractors, not to control prices, but for the purpose of educating each other to costs. Price will take care of itself naturally if each knows his cost; for it isn't natural for a man to sell less than cost if he knows it. It is just the difference between knowledge and ignorance, efficiency and obstruction.

An Australian hardwood, known as "Yate," has an average tensile strength of 24,000 lb. per sq. in.

Wall Finishing in Foreign Houses

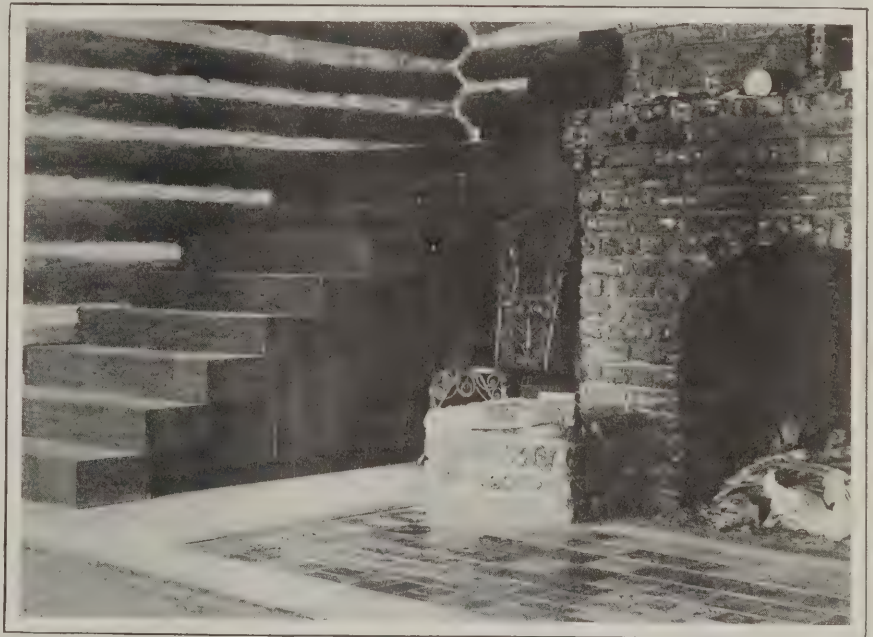
Some interesting comments on the finishing of walls and the prospects for the introduction and use of prepared wall board in houses in various countries are contained in recent Consular reports to the Department of Commerce and Labor. In the Marseille district in France it is stated that the walls of buildings are almost invariably of stone with brick partitions. Laths are not used in Southern France, but the ceilings are made of wooden cross pieces to which woven reeds are nailed and coarse plaster added to form a base for the final coat of plaster.

In the Lyon district what is known as "lithoxyle" or stone wood is largely used for inside finishing, it being employed not only for floors and stairs but also for walls. It is said to be composed of sterilized sawdust, asbestos, magnesia and other chemical ingredients. The outside walls of the buildings are generally constructed of stone or pisé, with the corners sometimes in cement. Partitions are of plastered brick often strengthened by woodwork, while the ceilings are of lath and plaster.

The material used in the construction of buildings at Naples is composed generally of volcanic tufa. Less frequently bricks are used, the angles, beams and cross pieces being the parts of the building in which this material is used. Sometimes the walls of the buildings are made up of strata of bricks and tufa alternately arranged. The tufa is so soft as to easily permit of the penetration of a nail and wall board could be easily attached:

In Genoa the walls are mostly made up of bricks covered with a layer of mortar about $\frac{1}{2}$ inch thick, and this in turn is covered with a very thin layer of plaster which is usually coated over with a thin layer of coloring matter. Supports, pillars, etc., forming the body of the building are generally of cement, as are the floors and ceilings. The floors are surfaced with hardwood or polished stone and the ceilings are covered with mortar and plaster.

In Austria the building regulations are very strict



Staircase Corner of the Reception Room, Showing Open Fireplace at the Right

and rigidly enforced. The interior walls are chiefly of plaster and concrete, but bricks and laths are much used.

In Valencia, Spain, the brick used in the construction of buildings is of the old Roman type, measuring about 10 x 5 x 2 in. In the construction of interior walls, in cases where these are merely partitions and have no

considerable weight to support, the bricks are placed on edge instead of flat as in the outer walls and are then plastered and either papered or painted. Ceilings are constructed of canes, a species of bamboo, laced together and covered with plaster or stucco. The floors are of tile or mosaic with a narrow strip of wood running around close to the wall for nailing down carpets.

In Malaga nearly all the buildings, new as well as old, follow the same general principles of plan and of design. They are rarely over four stories high, usually of brick or brick and stone and solidly built so as to withstand earthquakes and make them fire-resisting. Walls and partitions of brick run entirely from the foundations to the rafters. The materials in these walls and partitions are not so hard as to prevent nails from being driven into them. Except the interior woodwork, hardware and window glass, the materials entering into the construction are found within the district itself.

Walls of Seville Houses

The walls of Seville houses are of solid brick and mortar and nails may be driven between the bricks. The ceilings are usually of split bamboo covered with plaster in a manner similar to the American lath and plaster method, though some ceilings have iron girders which are arched between with bricks. All ceilings and walls are kalsomined or painted, as papering is not known here to any extent because of the tendency of wall paper to mildew during the damp months.

Most of the new houses in Holland are built of solid material from the interior to the exterior without any studding or partitions between the walls. Plastering is then done directly upon the bricks. Such walls are very hard and nails can only be driven between the bricks into the mortar. The older houses have a cloth netting hanging almost a foot away from the wall on which the paper is suspended. According to dealers in building materials in this country, American wall board would be too expensive to meet with any success.

The principal wood used for building in Java is what is known as Java teak. Other hardwoods are sometimes used, some of which are so hard that it is impossible to drive nails into them. In constructing dwelling houses the walls are of brick and plaster both inside and outside and the ceiling is in most cases plank, although sometimes plastered. Laths are never used.

Wall board is unknown in the district of Karachi, India, and houses are almost invariably built of stone with a thin coating of plastering inside. It is very difficult to drive a nail more than an inch into the surface unless one happens to strike a joint between the stones.

The walls of all houses in Amoy, China, are brick, and lath and plaster are seldom used. The common practice is mud with a thin coating of cement. The cheaper native houses have practically no interior finish. The larger houses and the business and dwelling houses of the foreigners have some studding, but this class of building forms a very small proportion of the total number of structures.

Private Houses in Cape Town

In Cape Town, South Africa, the majority of private houses are of brick plastered on the outside and inside. In the better class of these buildings a large percentage of cement is used, and where this is the case it is difficult to drive in nails. In the majority of buildings both public and private the partitions are of brick, so that wall boarding or lath are not needed. A considerable amount of expanded metal lathing (principally of English manufacture) is used. The Germans have a wall boarding on the market here made of asbestos and cement, the boarding being 3/16 inch thick and comes in sheets 4 x 8 ft.

Buildings of Cement-Grout Construction

In the construction of the many houses, barns, kennels and other buildings on the extensive country estate of Joseph B. Thomas at Middleburg, Va., cement-grout poured in steel forms has been adopted with marked success, both in cost saving, and in producing permanent attractive buildings with the unskilled labor and utilizing rough stones, cleared from the fields. The plans of this interesting group were prepared by Frederick J. Sterner, architect of New York, and the system of steel forms invented by Milton Dana Morrill, a Washington architect, were employed for the work.

Liquid grout of cement, lime and sand were first poured into the steel forms, and into this grout rough field stones of all sizes and shapes were dropped and bedded. The forms were coated with rosin and sand to give a rough face, and after the forms were removed, a thin coat of cement stucco was applied to the walls. As from 7 to 9 ft. in height was poured at one operation, the work was rapidly done.

This grout construction is in no way new, as Romans employed it largely in the Coliseum, which for centuries has withstood the ravages of time. These walls were tremendously thick, and the inside and outside faces were first laid up and the middle part poured full of grout afterward. In our own time this construction has been largely used in Southern France, not where wood forms have been employed to receive this grout. These forms must be built watertight, which has made the cost prohibitive, especially for the lighter forms of construction. Steel forms, however, have been successfully used in the above mentioned work, and the cost per sq. ft. is practically nothing, as these forms are in the nature of a permanent equipment to be used over hundreds of times.

C. H. Haga, the superintendent of construction for the Thomas estate, has given the following interesting cost data on these grout walls, which would indicate that this form of construction might be used with considerable saving on foundations and walls generally where there is a scarcity of skilled labor. On rough stone walls it is difficult to get all stones perfectly bedded in mortar. In the grout walls this is much easier, as the stones are dropped and immersed in the wet mixture and a smooth finish is left inside and outside. Mr. Haga reports that this grout construction has been used on over 1000 cu. yds. of 12-in. wall, with common labor at 19½c. per hour. The cost per cubic yard was:

1 yd. field stone	\$0.60
¾ yd. sand at \$1.50	1.12
300 lb. cement at \$1.50 bbl.	1.12
100 lb. lime	.48
Mold setting and pouring	.89
Total cost	\$4.21

As one cubic yard makes 27 sq. ft. of 12-inch wall, the cost per square foot of finished walls is slightly less than 15½c. This "grout" construction showed a considerable saving over rough stone walls which must be laid up at least 18 in. in thickness.

San Francisco's Building Record

Since the great fire and earthquake some years ago which practically destroyed the city of San Francisco, the total building contracts entered into have aggregated up to August of the present year a total of \$239,224,801. All buildings erected within two years after the fire cost from 25 to 30 per cent. more than the original recorded contract price, and since then they have cost at least 10 to 15 per cent. more than the original recorded contract price. It is, therefore, conservatively estimated by San Francisco building interests that the total expenditure for building operations in that city since the fire is not less than \$294,500,000.

CONSTRUCTION OF STORM SASH AND PORCHES

How to Protect Our Homes from the Cold Blasts of Winter Through the Use of Storm Doors, Sash and Enclosed Porches

By JOHN WAVREK, JR.

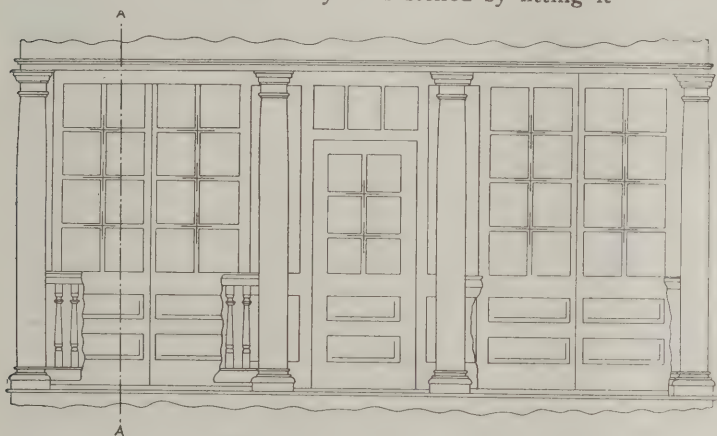
WITH the approach of cold weather it behooves those of us who are not overly blest with this world's wealth to take into consideration the fact that we should save a penny wherever it is possible so to do. In the light of the present high prices of coal we should economize in that commodity by protecting our homes as much as possible from the cold blasts of winter. In what follows are some suggestions which I feel will greatly help to attain this end because I have demonstrated the fact to my entire satisfaction.

In the first place I would recommend that storm sash be substituted for shutters or blinds wherever possible, as the advantage of the storm sash is very evident. As a means of ventilation a small metal ventilator may be placed in the bottom rail of the storm sash which can be opened and closed as may be required. The storm sash may be fastened by fitting it

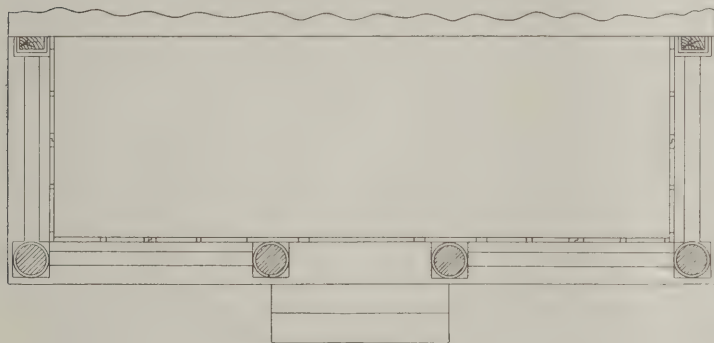
by an ordinary carpenter, and can readily be removed during the summer; or the sash may be substituted by screens and the panels left in place permanently, giving extra space for the housewife. I know of many such enclosed porches where the women folks keep their flowers during the winter, thus making a very beautiful effect and heightening the value of the property.

This enclosure is made up in sections allowing of easy removal at any desired time and can readily be stored away.

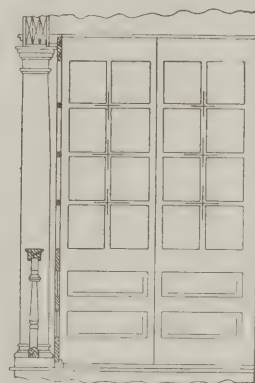
The method of constructing this enclosure is, I think, fully shown in the accompanying sketches. If the mill-



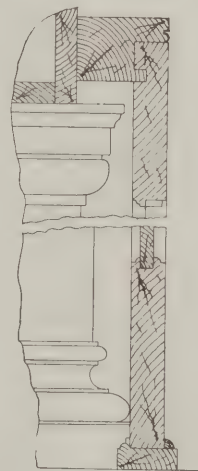
Front Elevation of an Enclosed Storm Porch



Plan View of Enclosed Storm Porch



Section on Line A-A



Detail Showing Construction

Construction of Storm Sash and Porches—By John Wavrek, Jr.

into the space usually occupied by the shutters or blinds. The sash may be hung on hinges or screwed fast to the blind stop. In cases where the outside casing is $\frac{7}{8}$ in. thick the sash is rabbeted to lap over it. I would suggest the use of at least $1\frac{1}{8}$ -in. stock for the sash and the outside casing being only $\frac{7}{8}$ in. thick—especially at the bay windows—the sash would project $\frac{1}{4}$ in. beyond the outside line of the casing. In order, therefore, to make a good job the sash should overlap the casing at the sides and head, while the fact that it is rabbeted makes it a practically air-tight job.

I submit some sketches showing a scheme of enclosing the front porch. These parts can all be made up and completed at the planing mill and put in place

man has taken his measurements correctly, it is an easy matter to have the panels and door put up. If it is found desirable to remove them during the summer it may be done by the man of the house without much help if he has the least idea of a mechanic.

In putting this work up the second time it will not require a carpenter, for all the parts will have been fitted previously and need only be screwed in place. The bottom or shoe rail could be left fastened to the porch floor permanently and also the rabbeted piece on the inside of the porch plate. All that would be necessary to do would be the removal of the screws holding the different parts in place. By adding these fixtures to your home many a ton of coal may be saved.

The rear porch, which is generally used by the women folks for a laundry, is a very disagreeable place to do this work during the cold weather.

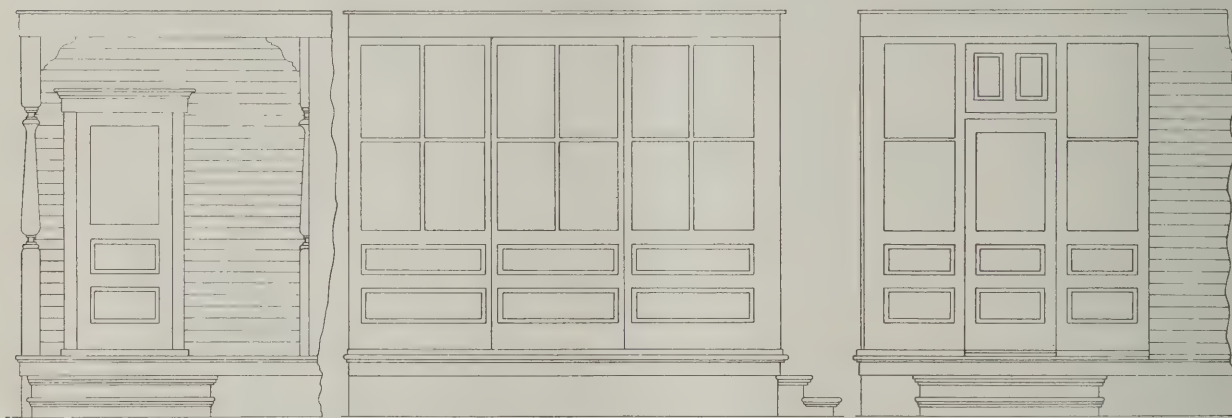
However, by a little expense it can be made very comfortable for the washwoman. I also send sketches showing the method of closing in the rear porch. As in the case of the front porch, this work can also be completed at the planing mill and put in place by a carpenter and taken down as easy as in the former case.

Every fall our mill is called upon to take measurements for this kind of work and it gives great satisfaction. It will certainly pay a mill to follow up this kind of work, for it is the means of saving many a dollar for the man who has it added to his house.

Where this scheme seems to be too expensive it is advisable to at least build up a temporary storm vestibule made up of three panels, one of which has a door to it, the top covering being of beaded ceiling held together by battens. The whole job can be screwed together and be of much benefit to the owner.

Electric Signals for Hoisting Engines

Some time ago we gave numerous signals used by hoisting engineers and others in connection with building operations and it may not be without interest to describe the signals used in erecting the steelwork in the tall Municipal Building in New York City. These were embraced in a special system of electric signals.



The Open Porch

Side View of the Same Porch Enclosed

A Rear View of the Porch

Construction of Storm Sash and Porches—By John Wavrek, Jr.

The signalman who was stationed high up on the work where he could observe all the hoisting operations wore a belt to which were attached a number of push buttons. These buttons operated the signals in the engine house through a special electric cable containing several pairs of insulated copper wires and protected by an outside spiral strip of metal.

The signals were given by an electric siren and by different colored electric lights and provided for the raising or lowering of the load at high speed or low; for swinging the boom to either side and for stopping any movement. They were instantaneous and positive, thus enabling the engineer to respond immediately and eliminating all uncertainty of transmission.

A special pair of wires running through the center of the cable carried a constant current, irrespective of whether the signals were being operated or not and in case this cable broke an alarm bell in the engine house was rung by the interruption of this current.

An important feature of the apparatus was an automatic recording device which by means of clockwork prints a record of every signal transmitted on a continuous paper ribbon, thus giving permanent accurate data that will show positively whether or not the signals were correct or were properly obeyed.

Moving a House by River Barge

We have frequently made mention in these columns of notable housemoving operations, ranging all the way from a small structure up to a railroad station and mammoth cathedral weighing thousands of tons, but among the most novel operations coming to our notice was that involving the removal to a new site three blocks away in New York City, of a two-story steel skeleton frame house measuring 41 x 27 ft. and having a tower 62 ft. high. The building weighed about 150 tons and the removal was effected without interfering in any way with the active service of its occupants, who were the crew of one of the municipal fire boats.

The building was moved to clear the site and facilitate the operations of the contractors for the construction of the steel tubes under the Harlem River for the new Lexington Avenue subway. The house was jacked up about 3½ ft. in the week previous to its removal and lowered to a bearing on iron pipe rollers on four lines of timber runways extending across the deck of a 30 x 80 ft. barge moored to an adjacent dock. Tackle attached to the house was operated by the hoisting engine of a pile driver, and in about five minutes the house was pulled 23 ft. to the edge of the barge. The pulling was then continued intermittently, so as to advance it about 3 ft. across the barge at intervals corresponding with 3 in. rises in the tide, thus unloading the barge so that its increased displacement corresponded approximately with the lifting effect of the tide, and

the deck was kept at about the original elevation, despite the added load. In this way the entire weight of the house was transferred from the shore to the barge in about 45 minutes. The barge was towed to its new location in 12 minutes. It was unloaded from the barge on a falling tide by reversing the loading operation and was moved across its new pier, revolved 35 degrees in a horizontal plane, and transferred to its new foundation, where plumbing, electric light, telephone and fire alarm lines had been prepared for immediate connection.

During the time the house was being moved flexible connections were maintained with the telephone and fire alarm cables, so that the fireman remaining in the house during its transit were not deprived of the regular alarm service except during the 12 minutes that the barge was in motion, while even during this period a temporary telephone booth was installed in order to maintain communication. An alarm was given and the fireboat called out while the building was being placed on the barge.

Torrey pine, a distinct California species, has been found in only two isolated localities in the southern part of the state.

PAINTING CONCRETE AND CEMENT SURFACES

How Linseed Oil May Be Used—Cement Paints in Liquid Form—Flat Wall Paint for Interiors



At the ninth annual meeting of the Illinois State Association of Master House Painters and Decorators held in Peoria, one of the papers read was that by R. H. Langston of Chicago, dealing with the painting of concrete and cement surfaces.

At the outset he emphasized the fact that this is only one of the many new problems that changing conditions of recent years have brought to the master painters of the present day. The rapid decrease in the lumber supply and the vast improvements made in cement construction whereby it has been adapted to every conceivable purpose, all serve to bring it into extensive and increasing use. The speaker predicted that the time would come, and that in the not very distant future, when on exterior painting more paint would be applied over concrete or cement surfaces than on wood. His remarks were, in substance, as follows:

Ordinary Linseed Oil Paints not Suitable

It must be understood that ordinary linseed oil paints cannot be applied with success directly to cement or concrete surfaces on account of the alkaline lime present in the cement. The action of this alkali is to burn up or destroy the oil, causing rapid fading of colored paints, and chalking and scaling off of the material. Therefore, it is necessary, if a linseed oil paint is to be used, that the surface be first thoroughly saturated with a neutralizing wash that will destroy the alkali action. The most approved method is to use a solution of zinc sulphate, made by dissolving sulphate of zinc crystals in water in the proportion of 3 lb. to a gallon of water.

A cement surface treated with this wash and allowed to dry can then be painted with any high-grade linseed oil paint without danger from alkaline action, and with the assurance that results will be lasting, as if applied to a wood surface.

Many manufacturers now put out cement paints in liquid form, ready for use, in white and all shades; the vehicle used in these paints being alkali proof and therefore requiring no treatment of the surface before the paint is applied. Paints of this nature are being used extensively on cement and concrete construction with the very best of results, and can be obtained at a very reasonable price.

Water Color Paints

"Water color paints" should not be used for exterior cement coating, as they do not form a waterproof coating (one of the most important requirements of a cement paint) and offer no protection from deteriorating influences.

For interior cement surfaces no better material can be employed in the way of paint than an approved flat wall paint. Most of the leading brands of flat wall paint being of an alkali proof nature, and where a

gloss finish is desired any ordinary gloss paint or enamel may be applied over one or two coats of the flat paint.

All new laid cement surfaces, either exterior or interior, should be allowed to become thoroughly dried out and hard before painting, and the best results have been obtained where the work has stood not less than a month before paint was applied. If the surface is dry and the paint right, it will penetrate freely on the first coat, filling the pores and rendering the peeling impossible, but this would not be the case if applied over a damp surface.

Exterior cement paints should dry to a flat or semi-flat finish in order to carry out the stone or cement effect. Nothing looks more out of place than a full gloss paint applied to exterior cement surfaces.

Cement construction, especially of a lighter type as applied to residence work, is subject to very rapid deterioration unless protected and made waterproof by the application of a suitable paint, and while in the early history of cement construction little attention was paid to the matter, owing probably to the fact that cement work at that period was confined to rough, heavy construction, such as factories, warehouses, etc., at the present time all architects and builders recognize the fact that, aside from the embellishment and decorative feature whereby the cold, unfinished appearance of cement construction is made attractive and pleasing to the eye, that the protective and waterproof feature is of great importance. It is being plainly demonstrated in many cases where cement-made houses have remained long unpainted, that exposed parts become water-soaked by afterwards freezing and burst the bond, causing cracking and crumbling of the construction and, therefore, with the increasing use of cement construction, we may expect a greatly increased demand for the painting of these surfaces.

Painting of Cement Floors

The painting of cement floors, especially in factories, warehouses, stores and public buildings, is a necessity in order to prevent the constant powdering of the surfaces from the wear, with consequent damage and annoyance from contact with this lime dust. For cement floors, the same as for other cement surfaces, the paint must be of an alkali proof nature, but quick drying with a good gloss and must produce a tough, elastic waterproof surface.

Many of the ready prepared cement floor paints, the quick drying vehicle of which is largely China wood oil, have been found to give excellent results, and I would recommend their use by the master painter, until such time as a more complete knowledge of the requirements in mixing of this material can be obtained. There is no doubt that, for some time to come, the master painter will be feeling his way, step by step, in his new realm of modern surface painting which cement construction has forced upon him. It will tax the brain of the paint chemist to formulate the vehicle with which to absolutely destroy the alkaline base which cement surfaces are loaded with, and it will be necessarily slow in reaching us, for time and elements are the only factors which will buy time exposure, and to show whether they have arrived at the point of absolute elimination or of perfect assimilation of the vehicle with the cement surfaces that is coated,

therefore, will require patient effort. We are all aware that the goal has not been reached by any means, but constant scientific research will land us in the promised land of perfection, as it is doing in every other line of industrial developments.

Following is the specification adopted by the Pennsylvania State Association, the only specification which the speaker knew of as having been adopted by any state association:

"Prepare and close up all cracks and other surface imperfections with plaster or cement. To all surface apply a thorough coat of 'Macnichol's Basic Coater,' giving 24 hours to dry, after which apply three coats of paint, color to be selected, each coat to be thoroughly dry before the application of another. The plaster or cement must be thoroughly dry before painting.

"Scrape off old paint where necessary, close up all cracks and other surface imperfections with plaster or cement. Apply a good coat of 'Macnichol's Basic Coater' over all new cement or plaster, giving 24 hours to dry, after which apply two coats of paint, color to be selected, each coat to be thoroughly dry before the application of another. The plaster or cement must be thoroughly dry before painting.

History of Architectural Drawing



SOME very interesting comments regarding the history of architectural drawing are contributed by an English writer to one of our foreign contemporaries and from what he has to say on the subject we extract the following:

"Did the Greeks and Romans, our masters in architecture, make drawings of the edifices they designed? Was the art of architectural drawing in existence among them? The question is one which we have no means of

satisfactorily answering, but the researches of the most competent authorities make it clear that the ancients followed some different practice from the usage of modern architects in this matter. It can only be conjectured what their method was.

"It appears probable that drawing was not practised, and that instead of that it was the custom of the architect to make a model of each edifice he designed. The actual construction was carried out under the designer's own direction, he being present and himself prescribing every detail of the work, the measurements and the profile, to the operative masons and sculptors, and often executing portions of the work with his own hand.

"We have, however, proof that the art of drawing plans was not altogether unknown to the Romans. Paper, in the modern sense of the term, did not exist; but, in place of it, plates of marble were probably employed. The remains of at least one ancient sketch has, in fact, been preserved to us. We refer to the fragments of the plan of the ancient city of Rome, which are built into the wall upon the staircase of the Capitoline Museum, and to another tablet lately discovered. The age of these fragments cannot be placed later than the times of the Emperor Severus or Antoninus. The relics are, moreover, of value, as they make known to us the existence of certain buildings of which we otherwise have no trace.

"The next oldest relic of a similar kind which has come down to us is that of the Abbey of St. Gallen. This contains, on parchment, the drawing in simple lines of the normal plan of a monastery, with all the buildings belonging to it. The age of this document

is not later than the fifth or sixth century, and it was produced at the Court of the Frankish kings.

"After this, we find in the regulations of the lodges of mediæval times certain strict directions enjoining upon builders the duty of exactly following the sketches of the edifices they are engaged upon. Another section prescribes that the rules for tracing and laying out of carved wood, etc., are to be kept strictly secret. On the other hand, within the lodge, it is recommended that the fullest possible instruction should be imparted. By a very fortunate accident the old working drawings of the towers of the cathedrals of Cologne and Ulm have been preserved. They are believed to date from about the year 1350 A.D., and are now kept at Cologne. They were discovered by Herr Möller, who published facsimiles of them.

When Architectural Plans were Current

"It is not before the age of the Renaissance that we have any architectural plans *in extenso*. Belonging to this period are the collection of hand-drawings in the Uffizi at Florence. Lately, too, the architect, Von Geymüller, has published the plans of Bramante and Raffaele for St. Peter's at Rome. These documents are drawn with a pen in simple outlines on parchment or paper. From the sixteenth century the drawings which have come down to us are more frequent, and they are more complete in their style of representation.

"With regard to the masters of the late Renaissance, we have a number of plans by Palladio and others. In the Museo Civico of Vicenza, Palladio's native city, there is a rich collection of his drawings preserved. They are on rough paper, and boldly drawn with the pen in sepia, and show a little shading. In the Church of St. Petronio at Bologna, at the end of the southern side aisle, there is a room with about thirty plans, by celebrated architects of the fifteenth to the seventeenth centuries, for a façade for that church. The style is mostly Gothic, a style which, however, was not understood by Peruzzi, Giulio, Romano and other masters of late Renaissance. The non-Gothic drawings of Palladio and Alberti are better. Possibly there may be plenty of other old drawings scattered in different collections. In those mentioned, all that is attempted is the representation of the ground plan and façade. The style of representation is very simple, being only linear. The instruments and other aids to the draughtsman were, in the times we have spoken of, of a very limited and imperfect description.

"It is only from the sixteenth century onwards, after the invention of printing and wood engraving had rendered possible the publication of the works of Alberti, Vignola and Palladio by Scamozzi and others, that complete architectural drawings date. It was only after the doctrine of projection had been worked out that architectural draughtsmanship was able to attain the perfection it presents in the present day.

Club House for Hebrew Association

Plans have recently been completed by L. A. Abramson, architect, for the Young Women's Hebrew Association for the ten-story club building covering an area 100 x 100 ft. and estimated to cost in the neighborhood of \$250,000. The structure is designed for a building on the north side of 110th Street between Lenox and Fifth Avenues, New York City.

John P. Applegate, carpenter and builder at New Brunswick, N. J., won two prizes at the Monmouth County Fair recently held this year at Red Bank. He was awarded blue ribbons for his Loudon booth exhibit and Loudon Machinery Exhibit.

A LOW COST COTTAGE FOR A WORKINGMAN

A Floor Plan Arrangement Which Utilizes All Available Space and
Furnishes the Modern Conveniences at Small Cost

THE design which is presented herewith is intended for the home of a man in moderate circumstances. It is as compactly arranged as circumstances will permit on a floor plan 24 x 36 ft. in area. An examination of the drawings shows that from the vestibule one enters the living room with its alcove and seat at the front and open fireplace to the right. The vestibule, of fair size, is a feature without which the architect does not consider a house complete. The colonnade effect at the alcove is of such a nature that bookcases are provided on the living room side, these being indicated by the swing of the doors on the plan.

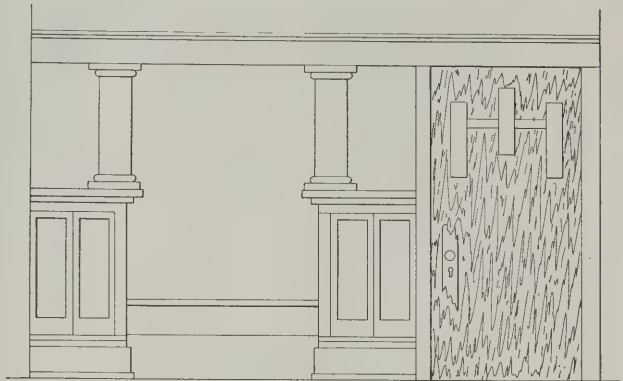
Beyond the living room and communicating with it by a double swing door is the kitchen of convenient size and provided with an equipment in keeping with a house of this character. In addition to the screened porch opening out of the kitchen there is also an entrance from grade which leads to the basement. By this arrangement there is obviated the necessity of carrying through the kitchen everything that usually goes into the basement. This is a feature greatly appreciated by the occupants, but it is hard to place in a small house.

There are two bedrooms occupying the left side of the house and between them is the bathroom, which

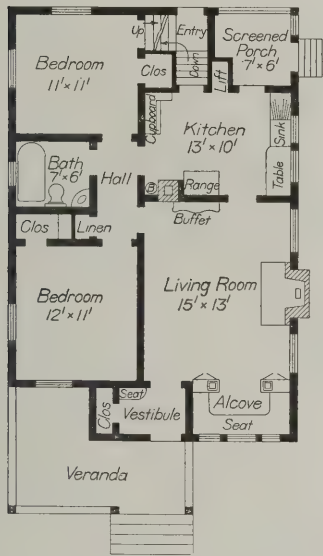
Flooring, finish, etc., Nos. 1 and 2, per M... 36.00 to \$40.00
Rustic, ceiling, siding, etc., per M..... 26.00 to 30.00
Shingles, per M..... 2.25 to 3.25
Door and window jamb stock, per M..... 37.00

For specific lengths \$1 should be added to all lists and for surfacing \$1 per M.

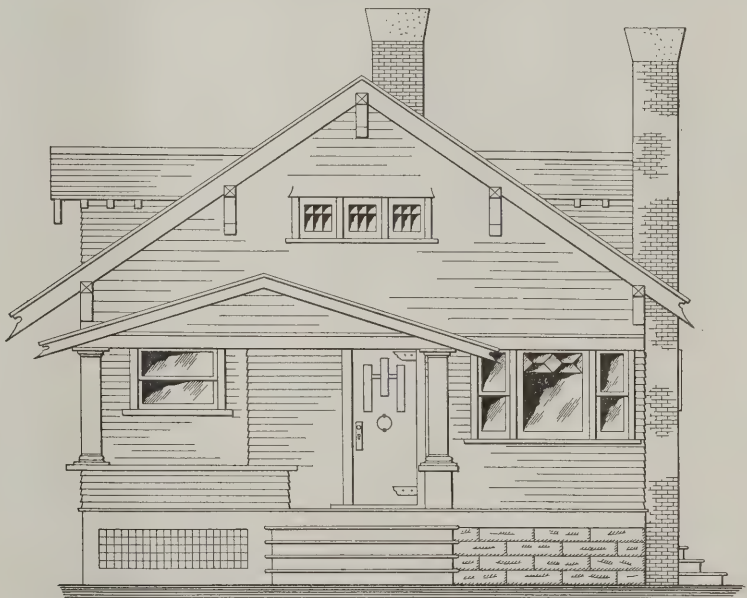
Concrete foundation walls can be contracted for at from 75 cents to 90 cents per running foot of wall 7



Living Room Looking Toward Alcove and Front Door



Floor Plan—Scale 1/16 In. to the Foot



Front Elevation—Scale 3/8 In. to the Foot

Cottage for a Workingman—Architect A. A. Thogersen, Portland, Oregon

opens from the passageway or hall which connects the two bedrooms.

The architect is A. A. Thogersen, 93 North Sixth Street, Portland, Ore., who states that the house here shown can be built in his section for \$1,300 finished complete. In other localities this figure will vary, depending upon local costs of labor and materials as well as upon the style in which the owner desires the house trimmed and equipped.

Some of the prices of material used in the house here shown are as follows:

Rough dimension stuff, per M.....\$16.00
Common boards, per M..... 15.00
Shiplap, 6 in., 8 in. and 10 in., per M..... 15.00
Cull dimension stuff and cull shiplap, per M. 9.00

ft. high and 6 in. thick. The concrete man places all "forms," but does not remove them.

Common brick costs from \$10 to \$14 and press. brick costs from \$55 to \$70 per M.

Hardwood floors cost from 11 cents to 17 cents per square foot laid and finished. The flooring, etc., costs from \$60 to \$90 per M.

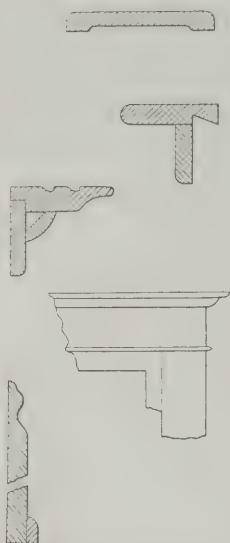
Excavating—ordinary—costs from 25 cents to 40 cents per yard.

The scale of labor is as follows:

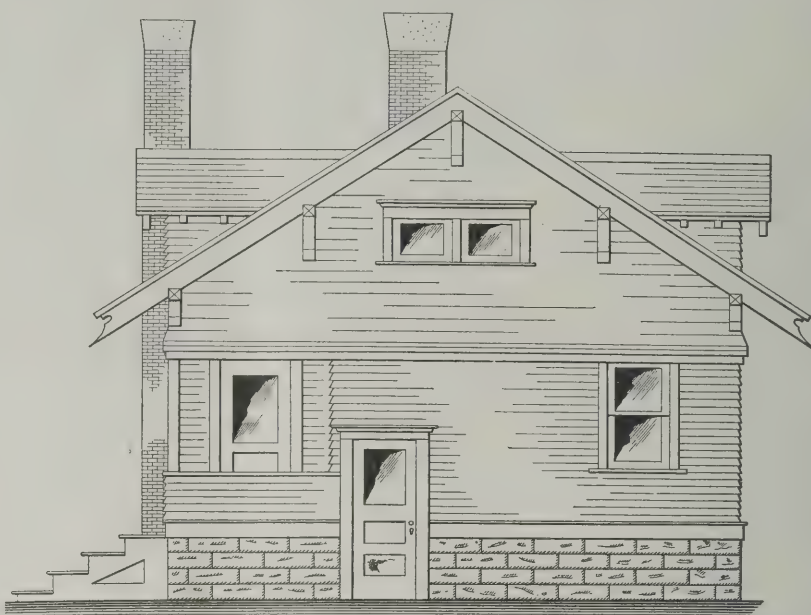
Carpenters\$4.00 for an 8-hour day
Cement finishers 4.00 for an 8-hour day
Bricklayers 4.00 for an 8-hour day
Plumbers 5.00 for an 8-hour day
Common labor\$2.25 to 3.00 for an 8-hour day
Carpenters' helpers 2.50 to 3.50 for an 8-hour day

In discussing the matter the architect states that in designing a house when not hindered or limited by the tastes or requirements of the owners his first and greatest effort is to arrange the floor plan so that it

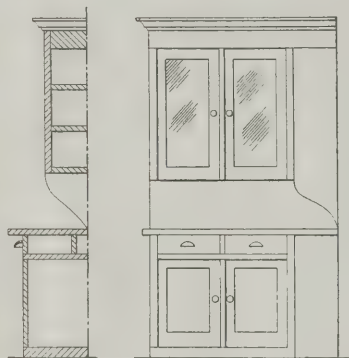
been utilized to the best advantage for the low cost with a ground area of 24 x 36 ft. It embodies about as much of what is necessary, and as many of the conveniences as can be found in a house of its size.



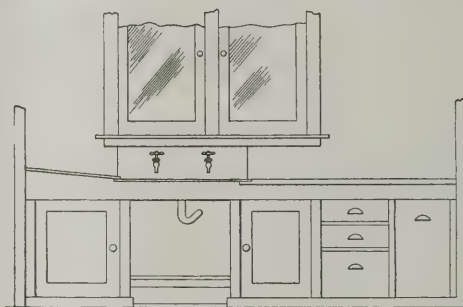
Various Details of the Interior Trim



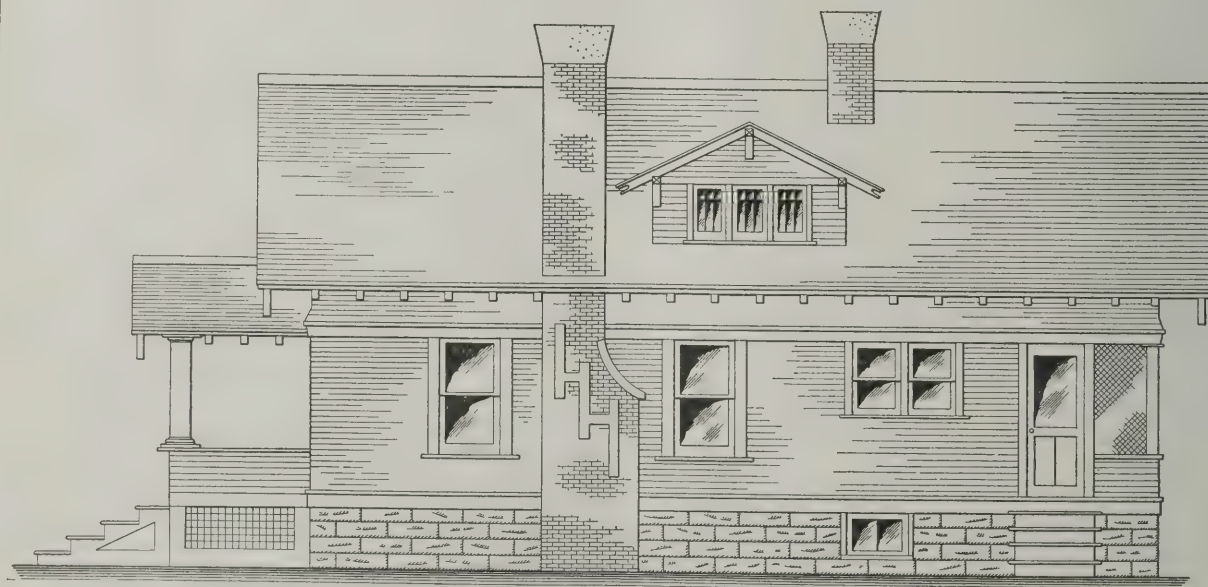
Rear Elevation—Scale $\frac{1}{8}$ In. to the Foot



Section and Elevation of Kitchen Cupboard



Kitchen Sink and Drainboard with Cupboards Underneath



Side (Right) Elevation—Scale $\frac{1}{8}$ In. to the Foot

Cottage for a Workingman—Elevations and Details

will embody all the little conveniences so dear to the housewife and at the same time provide all rooms necessary and conveniently locate them. The house here shown represents much study and the space has

The great need of fireproof construction for Chicago hospitals is shown in the request of the Bureau of Building Inspection that 60 be torn down and rebuilt with fireproof materials.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

Washing Crushed Stone for Concrete Work

From Builder, Clinton County, N. Y.—I would like to say to "E. G. H.," Atchison, Kan., that washing crushed stone is bad practice as it washes out a lot of valuable fine material. A hose is about the only thing that will do a good job. If the correspondent cannot get clean stone he "is up against it" as the boys would say. If clean stone can be had the dirty ones should be used where dirt will not be injurious.

Flemish Bond in Brick Work

From L. F., Arlington, N. J.—For the benefit of "E. G. H.," Atchison, Kansas, I would say that it is better practice to cut the stretchers for closures in place of headers, as he will obtain better results in all cases.

In the case of Fig. 1 shown herewith the bond might

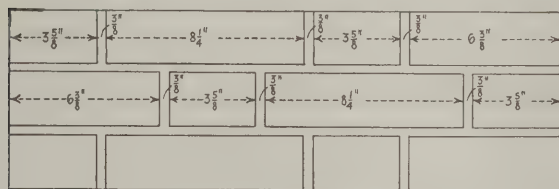


Fig. 1—One method suggested by "L. F."

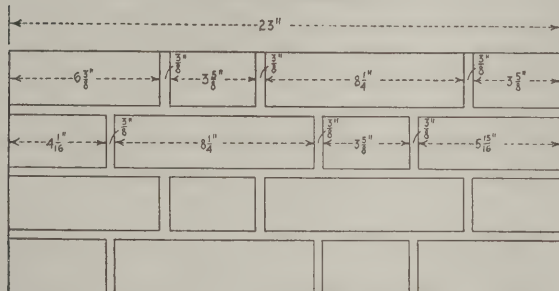


Fig. 2—Another method of bonding suggested by "L. F."

Flemish Bond in Brick Work—Methods Suggested by Various Correspondents

possibly be criticised for isolated piers, but if the piers form part of a cellar wall such as those between windows he should use the bond shown in Fig. 2 of the sketches.

From C. W. K., North Cambridge, Mass.—In answer to "E. G. H.," in the August issue of the paper and "W. M. L.," in the October number, I am sending my suggestion for 23-in. pier in Flemish bond as illustrated in Fig. 3. The headers do not center over the stretchers, but otherwise I think it is a simple method, requiring very little splitting of the brick.

Specifications for Exterior Plastering

From Ernest McCullough, Chicago, Ill.—In the October issue of *The Building Age* suggestions for stucco work prepared by the Associated Metal Lath Manufacturers were printed. From an extended experience in stucco work, the writer recommends these specifications

and believes they will do a great deal to improve such work all over the country. In one minor point, however, he believes a criticism is justified.

The barrel of cement was not until 1902 a constant quantity, every cement manufacturer having a barrel of his own. The Corps of Engineers of the United States Army, after considerable trouble with manufacturers, decided in the year mentioned that a barrel of cement should contain 380 lbs. net of cement and, no matter how many actual barrels were furnished on a contract, the statistical barrel on which payment would be made should be 380 lbs. of cement. Manufacturers commenced selling cement in bags—four bags to the barrel. The barrel then disappeared except as a statistical unit, and today it is nearly impossible to buy cement in barrels.

Measurements of cement, both loose and packed, showed such a variation in weight of a cubic foot that common custom settled upon a bag containing not less than 94 lbs. net of cement, 95 lbs. gross, as being the equivalent of one cubic foot. Therefore the present

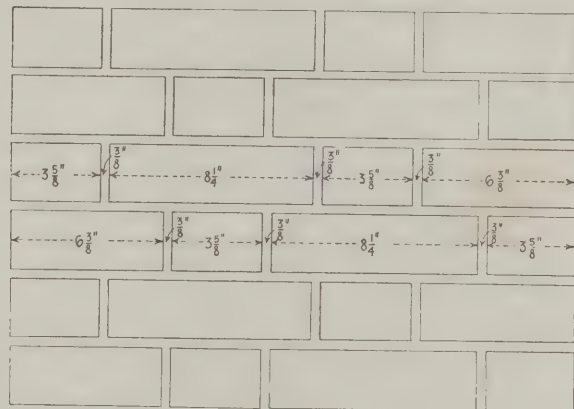


Fig. 3—Sketch accompanying letter of "C. W. K."

barrel, which is only a statistical unit, is composed of four standard size bags. The cubic foot of cement does not weigh 100 lbs., but is the amount of cement contained in a standard bag. Four years ago the American Society of Engineering Contractors declared in favor of the standard bag, containing not less than 94 lbs. net of cement, as the equivalent of one cubic foot of cement, and all the leading national associations of engineers followed. It is common custom, and therefore the specifications prepared by the Associated Metal Lath Manufacturers should omit all mention of the barrel and deal with the bag as a unit.

No cement user who handles small quantities of cement weighs the cement. The cement is handled in bags on such work, and all proportions given should consider the bag unit and give mixtures by bags, or cubic feet. The larger users of cement have commenced using bulk cement, and this will be the practice generally in the future, because of the economy and lessened waste. The writer suggests that the specifi-

cations mentioned be changed to say, "A standard bag of cement, containing not less than 94 lbs. net of cement, shall be assumed to be one cubic foot." The clause criticised makes it appear that by weight one cubic foot of cement equals 100 lbs., so a contractor under the thumb of a hair splitting inspector will be always compelled to weigh his cement, as a bag does not contain quite 100 lbs.

Plans for House for Corner Lot

From Sydney G. Koon, Brookline, Mass.—In a recent issue of the paper a correspondent asked for "a plan of a good-looking two-family house to be erected on a corner lot 60 x 90 ft.; separate entrances for each and with four rooms downstairs and four rooms upstairs for each suite." The correspondent did not say whether the house was to be built for speculation and sale, or whether he is to live in one half and rent the other. Assuming the latter to be the case, however, and that he wants a maximum of comfort and permanence, I am sending a design which combines both features.

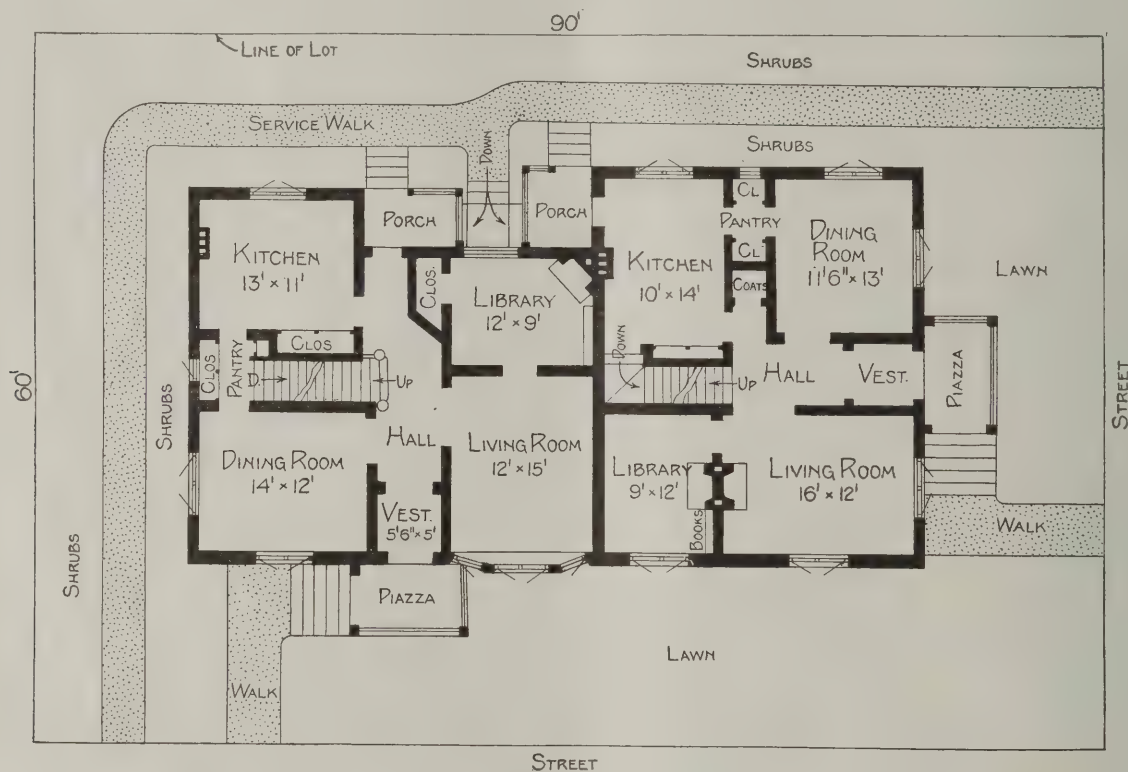
Permanence is assured by a fireproof structure with

the foundation may be of stone or hollow tile 15 in. thick and thoroughly waterproofed on the outside. The exterior walls of the first story are of hollow tile 10 in. thick and making 12 in. walls when finished with stucco "pebble dash." The outside second story walls are also of hollow tile 8 in. thick, making them 10 in. when finish with stucco "pebble dash." The principal walls are of 6 in. hollow tile, making them 8 in. thick when finished, while the partition walls of the closets, etc., are of 3 in. tile, making them 5 in. thick when finished.

As an alternative they may be of expanded metal on angle irons and plastered.

The cellar floor is of grout on cinder fill. The main floors are of hollow tile with reinforcing rods or they may be of reinforced concrete or of 3 in. plank resting on 6 x 10 in. solid beams, the finish floor being of $\frac{7}{8}$ in. maple. The floors in the upper part of the house are of 2 in. plank resting on 4 x 10 in. beams and having a finish floor of $\frac{7}{8}$ in. maple.

The roof is covered with tar and gravel laid on 3 in. plank which rests on 6 x 10 in. solid beams. The roof should be at least 36 in. in the clear above the ceiling of the second floor.



Plans for House for Corner Lot—Main Floor Plan Scale 1/16 in. to the Foot

minimum call for repairs and depreciation. As this also, with hollow tile walls, makes a house warmer in winter and cooler in summer, comfort is conserved. The very liberal provision of closets will appeal to the housewife, as will also the fact that the arrangement makes all rooms accessible with very few steps. Hollow-tile partitions do not carry sound, thus insuring privacy. They are also vermin-proof.

The first cost is 10 per cent to 15 per cent heavier than wooden construction with clapboards, but with lower cost of heating; insurance and repairs cut in half or better and maximum comfort in all weathers the hollow tile is cheapest in the long run. That is why so many houses are now being built of permanent materials instead of flimsy quick-burning wood.

You will notice that for wooden floors—specified as alternative to fireproof—I have used heavy timbers and planks which while more expensive than the usual "shell" are safer and much more durable.

As regards materials of construction, I would say

The front piazzas have maple flooring on concrete or hollow tile, while the rear piazzas are of frame throughout. The sleeping porch is also of frame construction and screened. The roofs of the piazzas are covered with asbestos shingles. All windows are of the casement type having metal frames and sash.

The stairs are of reinforced concrete with maple treads.

The heating may be hot water or steam with separate plant for each house. Each kitchen is fitted with gas or coal stove, also with gas water heater.

The ground area of the house is 1722 sq. ft. and net heights 23½ ft., giving an inside volume or cubage of 40,467 cu. ft.

The estimated cost on a basis per cubic foot ranging from 20 cents to 23 cents would be from \$8,100 to \$9,300, depending upon location, etc.

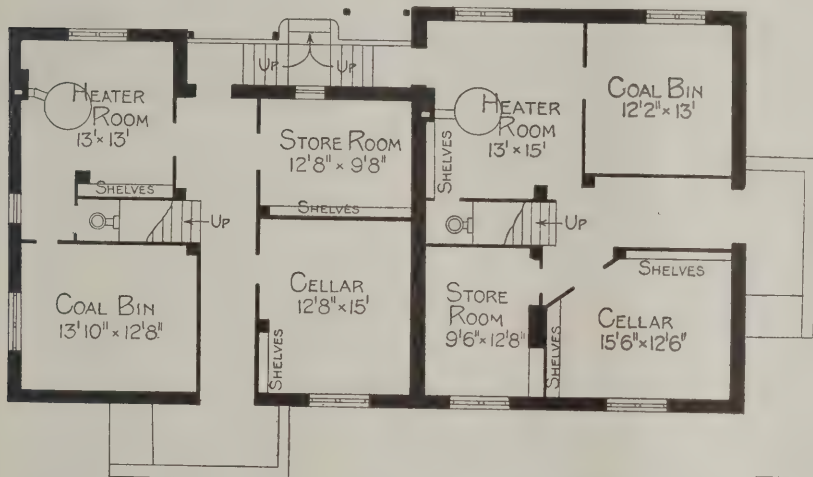
Alternative roof construction increasing somewhat the cost as specified above, would include gable with ridge pole running from end to end of the house.

This would provide a large storeroom or attic for each house, part of which could be fitted up for billiard room if desired. Access would be by stairs directly over the main flight. The roof should be covered with asbestos shingles which are more permanent than wooden shingles, costing more at first, but less in the long run, and are fireproof.

An alternative arrangement for inside the house is to put the dining-room, kitchen and stairs next to the "party wall," the living-room in the corner of the house with the library at the back. This would move the bathroom to the position on the second floor now occupied by the head of the stairs.

Rendering a Partition Wall Sound-Proof

From E. M. B., Waitsburg, Wash.—As a subscriber to the paper, I would like to have some of the practical



Foundation Plan—Scale 1/16 in. to the foot

readers tell me how best to solve a problem which is puzzling to me. The case is a partition wall between a tinshop 24 x 70 ft. in size and a telephone office 12 x 70 ft. in size. These two rooms are separated by a partition wall with 2 x 6-in. studs 14 ft. high and having 5/8 x 4-in. tongued and grooved ceiling on both sides. The ceiling of both rooms is of the same material. One side and end of each room is plastered with wood fibre plaster.

What will be the best way to deaden the sound between these two rooms? Will a 2 x 4-in. wall set with 2-in. air space, ceiled with 1 x 4 tongued and grooved lumber and filled with sawdust satisfactorily solve the problem?

The floor is 1 x 8 in. shiplap placed diagonally and a 1 x 4 in. finish floor. There is no partition in the basement and I desire to know if it will be necessary to have a partition there, and if so, what kind?

Note.—With no desire to anticipate the many suggestions which we feel our practical readers will offer in the way of a solution to the problem above presented, we would suggest a careful perusal of the opinions relating to sound-proofing walls, which will be found on pages 75 and 76 of the February issue.

Preventing Stucco From Cracking

From E. M., Chicago, Ill.—In reply to "C. C. S.," Schenectady, N. Y., whose inquiry appeared on page 427 of the August issue of *The Building Age*, I would

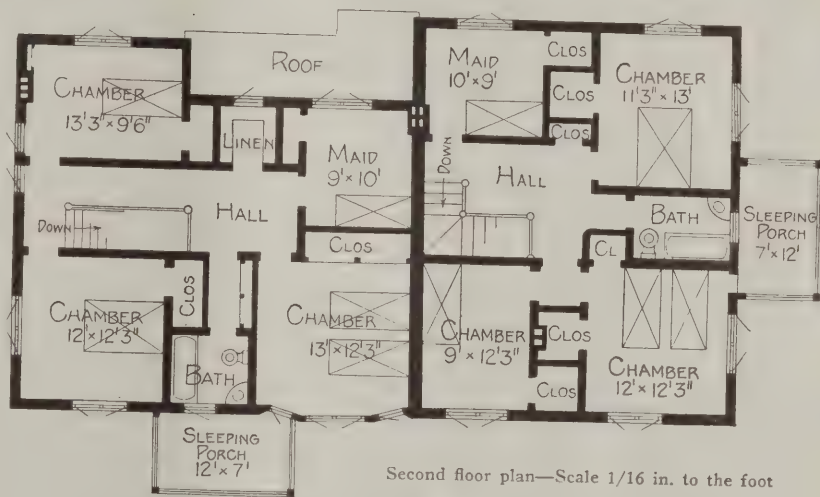
say that the only reason why stucco may not stick well to the surfaces of the field stone used in the foundation is the presence of dirt. Clean the surfaces thoroughly by washing. A light acid wash such as is used for cleaning brick work is good after clean water has first been used to help dissolve the dirt. Then apply a thin wash coat of neat cement and hydrated lime, half and half, mixed to the consistency of cream. When this is almost dry begin plastering in three thin coats, well pressed as applied. There should then be no trouble.

It helps the work if the joints are raked and then filled with a lime and cement mortar, consisting of one part hydrated lime, two or three parts Portland cement and four to five parts good, clean, well graded sand, measured by volume. Then after these mortar joints are set apply the stucco as above.

It is advisable to staple the lath to the wood above the wall and let it project over the foundation, thus having a joint which will allow of settlement and yet not produce any ugly break at the water table. To staple the lath to the cobble wall as advised by some builders will produce a good job, but it is more expensive than the above method.

Right to Withdraw Bid or Deposit

From H. W. Y., Toledo, Iowa.—In sending in a bid for a job, a certified check is always demanded, to be retained by the owners of the work as liquidated damages. If the lowest bidder, after being notified that his bid is the lowest, does not sign the contract and he withdraws his bid as



Second floor plan—Scale 1/16 in. to the foot

Plans for House for Corner Lot—Submitted by S. G. Koon, Brookline, Mass.

soon as he knows that he is the lowest, can the owners legally keep the check, although the clause is put in the specifications?

Answer.—If the bidder made no effort to withdraw his bid until it had been accepted, his refusal to sign a proper contract constitutes a breach which entitles the owner to retain and cash the check, if the amount of the check is not substantially larger than the amount of damages sustained by the owner on account of the builder's refusal to comply with his bid. If the check calls for a larger amount than the amount of such damages, the law permits the owner to retain the latter amount only, which is to be measured by the difference between the amount of the bid and the higher price which he is required to pay in order to have the work done. It is to be noted, however, that a bid is subject to withdrawal any time before it is accepted.

A. L. H. STREET.

Workmen's Time Check

From E. G. H., Atchison, Kans.—Referring to the inquiry of "A. J. W., Beach, N. D., in the August number, I think the best and simplest form of bookkeeping for him to use in recapitulating his time checks is the one indicated in the sample given below. Place at the top of the sheet the number of the contract and name of the building or job; in the left-hand space put the

LESLIE DOUGLASS, CARPENTER AND BUILDER, No. 146 BREAD STREET		
Time Report of _____		
For Week Ending Saturday, _____ 19__		
	LOCATION.	TIME.
MONDAY.		Hours
		..
		..
TUESDAY		..
		..
		..
WEDNESDAY.		..
		..
		..
THURSDAY.		..
		..
		..
FRIDAY.		..
		..
		..
SATURDAY.		..
		..
		..
TOTAL TIME,		

Forms of workmen's time check used by "L. D.," of Philadelphia, Pa.

transfer binder and file it away in case I want it for reference at any time. In this way I keep each finished contract separate and the binders in daily use clear of all dead matter. No more bound account books for me.

From L. D., Philadelphia, Pa.—I am sending one of my time sheets which I have been using for a number of years with entirely satisfactory results. It may be this is what "A. J. W.," of Beach, N. D., wants.

Self-Supporting Barn Roof

From O. S. W., Robinson, Kansas.—I would like to see published the latest form of self-supporting purlin for barn roof.

Soundproofing a Finished Floor

From W. H. R., Metropolis, Ill.—I would like very much to have some information as to the best method of deadening a floor. The building is already finished, the first floor being used for business purposes, while the second is fitted up for flats. The trouble now is that the noise from below disturbs the tenants above and I want to know how to overcome the difficulty. Any suggestions which the practical readers may give

LESLIE DOUGLASS, CARPENTER AND BUILDER, No. 146 BREAD STREET		
MEMORANDA OF MATERIALS USED.		
19__	LOCATION	MATERIALS

CONTRACT NO. 2625, BAUM BUILDING

Date 1913	Workmens' Names	Total Hours	Rate	Amount
Aug. 4-9	John Dooley	48	.50	24.00
Aug. 4-9	Tom Jerry	30	.35	10.50

Form of workmen's time check used by "E. G. H.," of Atchison, Kansas. Sheets measure 8½ x 11 Inches in Size

Workmen's Time Checks—Forms Used by Different Correspondents

month and date of the first and last day of the week; in the body place the men's names; on the right-hand side put the total number of hours, rate and amount in separate columns after each man's name. He can quickly transfer all this from his time check at the end of each week. He no doubt files his weekly time checks for future reference, so it would not be necessary to transfer the time each man worked daily.

By using a form similar to the above one can tell how much has been paid out for labor on each contract or job in ten minutes at any time during the progress of construction.

I have standardized all my estimate sheets, cost sheets, accounts, etc., etc., to letter size paper, 8½ by 11 inches in size. I punch these sheets on the left-hand side and bind in loose-leaf binders. When a contract or job is completed I collect all the sheets pertaining to that contract and bind them in a cheap

will be greatly appreciated by a perplexed owner.

Note.—It is possible that our correspondent may derive some suggestions of value from the comments on the subject of floor deadening which appeared in the Correspondence Department of the February issue of the paper.

Cutting Siding on a Circle

From L. R., Rice Lake, Wis.—Will some of the practical readers of the paper tell me how to cut 4-in. and 6-in. siding on a circle?

Framing a Square Tower with Posts Having a Batter of Six Inches to One Foot Rise

From G. L. Smith, Indianapolis, Ind.—Having read with much interest the various solutions of this problem since it was presented, the writer believes that so

far the readers have misunderstood the intention of the Los Angeles correspondent, and therefore desires to submit the following as his ideas of the problem.

While the size of post is not mentioned, it is usually 12 x 12 in. in structures of this character. It would therefore be impractical to back these timbers the same as a hip rafter. Its face sides, marked X-X in Fig. 3, would coincide with the sides of the foundation if the post were standing plumb. This fact alone makes the problem a difficult one—very different from the usual hip rafter—and is no doubt the point the correspondent desired to bring out.

The first step in the solution of the problem is to find the position of the sides of the post with regard to both horizontal and vertical planes of projection and extend or project these sides until they meet or cut these planes in a common point. These lines of intersection together with the edge of the post form a triangle, two sides of which constitute the upper and lower level of the post.

The next step will be to develop these triangles to their full size so that their sides may be measured by scale, and the angles thus formed transferred to the timber itself.

Having thus briefly outlined our solution, we will call attention to a very important point at A in Figs. 1

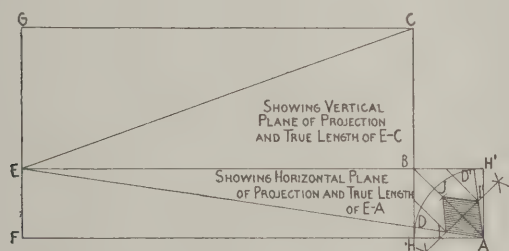


Fig. 1—Showing position of the sides of the post with regard to both horizontal and vertical planes of projection

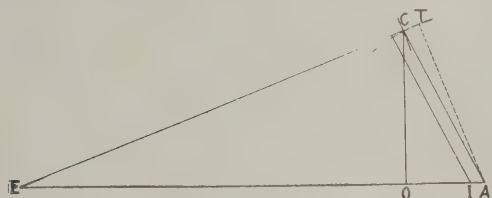


Fig. 4—Showing True Sized Triangle AEC of Fig. 3, with Sides Fully Developed

Framing a Square Tower with Posts Having a Batter of 6 in. to One Foot Rise

and 2. As previously stated, with the line $A-C$ of Fig. 3 standing plumb, the sides of the post will coincide with the wall lines $A-H$ and $A-H'$, but as the post moves or pitches inward—towards B —then the lines $A-H$ and $A-H'$ move toward $A-D$ and $A-D'$ respectively.

When $A-C$ has reached the position indicated by $A-B-L$ of Fig. 2, then $A-D$ and $A-D'$ will have arrived at the same position and all unite in a common line of intersection.

The point to be brought out here is this: $A-C$ has moved through an arc of 90 degrees, while $A-D$ moved 45 degrees, and whatever the position of the line $A-C$ the angle $K-A-C$ of Fig. 2 will always be double the angle $H-A-D$ of Fig. 1.

By applying a little trigonometry here it will be easy to figure the exact size of the angle $H-A-D$ and also the exact length of the line $H-D$, thus giving the exact position to the line $A-D-E$ which is the intersection of horizontal and oblique planes of projection.

This would be the proper method, but as one seldom has a table of signs, tangents, logarithms, etc., convenient when framing timbers, we will try to show what some call the graphic method of doing this. In Fig. 3,

draw the lines $A-F$, $A-H'$, $H'-B-E$, $H-B$ and $B-C$, thus establishing the position and extent of both horizontal and vertical planes of projection. Next in Fig 1 make $A-H-B-H'$ represent the plan and $A-I-J-I'$ the horizontal section at the foot of the post.

Develop this section as follows: Draw diagonal $B-A$ and parallel lines from $I-I'$ of Fig. 1. In Fig. 2 make $B-A$ the same as $B-A$ of Fig. 1. Erect the perpendicular $B-C$ the same as $B-C$ in Fig. 3 and connect A with C . Draw parallel lines through I and S , 3 and 6 ft. respectively. This is done to place I as far towards D as possible in Fig. 1, thus making the drawing more accurate for measuring.

Having completed Fig. 2, set off $A-J$ along the diagonal $A-B$ of Fig. 1 and with A and J as centers and radius $A-J$ strike the arcs and connect intersections as

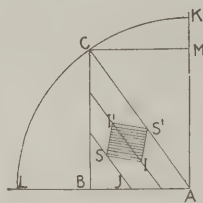


Fig. 2—Side Elevation of
hip

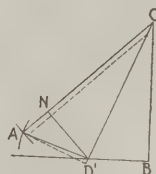


Fig. 5—Development of triangles $D'BC$ and $D'AC$

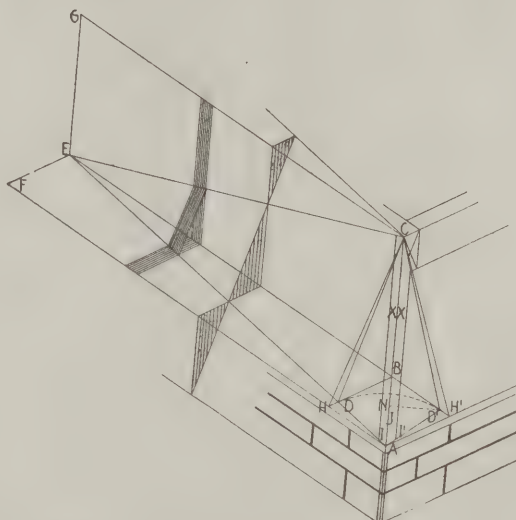


Fig. 3—Showing intersection of oblique surface of post with vertical and horizontal planes of projection

shown. Along this line set off I and I' equal to S and S' of Fig. 2; connect $A-I-J-I'$ for the section at the foot of the post. This establishes the points I and I' and shows the direction of the line $A-D-E$, which is the intersection of the face of the post with the horizontal plane of projection.

Through I project $A-I-D-E$, cutting $H-B$ at D and $H'-B-E$ at E . This line can now be shown in isometric Fig. 3 by setting off $H-D$ as shown and producing $A-I-D$ to E , as in Fig. 1.

Having established the point *E*, erect the perpendicular *B-C* in Fig. 1 and connect *E* and *C*. in both Figs. 1 and 3, thus showing the intersection of horizontal and oblique planes in Fig. 3 as well as the true length of this line in Fig. 1.

Having now shown the required triangle in isometric, Fig. 3, and having the true lengths of its sides in Figs. 1 and 2, it remains to construct the triangle full size, thus showing the true size of its angles or bevels and method of transferring the latter to the timber to be framed.

Referring now to Fig. 4, make $A-E$ equal to $A-E$ of Fig. 1. With A as center and radius $A-C$ of Fig. 2, strike the arc at T , also with E as center and $E-C$ of

Fig. 2 as radius strike the intersecting arc at *C*. Connect *A* with *C* and *C* with *E*, then the required bevels will be found at *A* and *C*.

To lay off with the steel square, extend *E-C* to *T*. From *T* drop *A-T* perpendicular to *E-T*. Place the square on the timber with *C-T* on one side and *A-T* on the other. Mark by *C-T* for side bevel at top of the post. With *T-E* and *T-A* on the square mark by *T-A* for bevel at foot of the post.

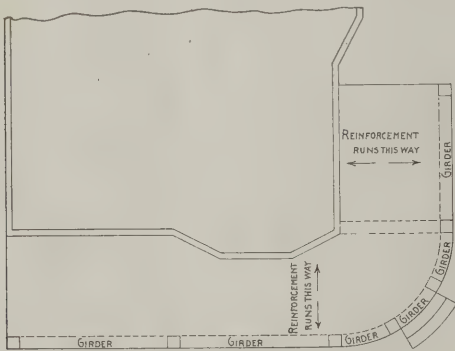
An inspection of Figs. 3 and 5 will show the necessary triangles and its development for the plumb cut without further explanation.

We have been reading most of the leading building journals for the past 20 years, and as well as we can call to mind this is the first occurrence of this problem in any of them, although I have heard it discussed as a catch problem or puzzle a number of years since. I think this is its purpose at the present time, as I have never seen it used in actual construction.

The modern windmill, however, with its steel tower, is built along these lines, and it is just possible that pattern makers or draftsmen in those shops may have construction of this kind.

Construction of Concrete Porch Floor

From F. C. S., Cornwells, Pa.—I am sending a pencil sketch of a concrete porch floor for a house which I expect to erect and would ask some of the practical



Construction of Concrete Porch Floor.

readers to answer the following questions, as the job is a new one for me. The piers in the front will extend above the floor about 2 ft. 6 in.

How thick should be the slab, and how reinforced?

How large should be the concrete girders to support it, and how should it be reinforced?

Should the girders be closer together than the piers, and if so, how many more are necessary?

Should the slab be cut through for expansion?

Of what materials should the concrete be composed and what should be the proportions of the mixture?

Any information which the readers may furnish will be greatly appreciated, as I want the porch floor to stay where it is put when I am through with the job.

Answer.—Answering the above questions Ernest McCullough, C.E., furnishes the following:

The slab should rest on the wall for the full thickness of the wall. It should project beyond the beams at least 6 in. The slab thickness should be $4\frac{1}{2}$ in., of which not less than $\frac{3}{4}$ in. and not more than 1 in. should be below the reinforcement. The reinforcement should run across the porch from the wall to the beams joining the piers. It should extend the whole length of the slab for perfect anchorage. Use expanded metal or wire mesh having an area of not less than $\frac{1}{4}$ sq. in. per 12 in. width and lap the edges of the sheets 3 in. If expanded metal is used the diamond should have a width of not less than 3 in.. If a wire mesh is used the longitudinal wires should be spaced not more than 4 in. apart. The

small wires across the main wires will be sufficient reinforcement for the length of the porch, as the loads are carried to the nearest support and the reinforcement the other way takes care of expansion and cracking.

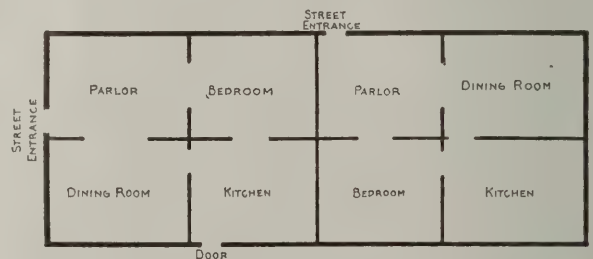
The girder should be not less than 4 in. wide and project just below the bottom of the slab 11 in., of which one in. will be under the steel. Use in each girder two square bars three-quarters of an inch square or two round one-inch rods. If twisted or deformed the bond will be better than for plain bars. One row of girders along the front of the porch will be sufficient, being made straight along the back on the curved front, so the steel can be kept straight. The steel to lap past the edges of the piers at least two feet. One bar should be bent in each beam at a point distant from the pier about one-third of the span at the bottom and go to the top at an angle of about 45 degrees and then straight from this point within an inch of the top across over the piers.

The concrete should be composed of one part first quality Portland cement, two parts clean graded sand and four parts clean stone or gravel ranging in size from one inch cube to one-quarter inch. The sand should not be too fine. If a natural bank gravel is used wash it, screen it and remix in the above proportions. The mixture should be mushy. It should not be so wet that free water stands on top and it should be somewhat sticky so a shovel or hoe must be used to pull it from the wheelbarrow. It requires no tamping but should be puddled with sticks or shovels so the air will be driven out and it will settle around the steel. A light tamping to help consolidate it will do no harm. Finish the surface as for a sidewalk but do not make it too smooth for it may then get slippery and will be liable to become dusty. If free water is standing on the surface sprinkle dry cement over it to take up the water and then finish lightly. The girders, and slab must be poured at one operation. This is important. Do not cut it through for expansion.

The girders are made no smaller on the short spans near the steps, as this is a place where more people are apt to congregate than at other places, therefore some additional stiffness is desirable.

Remodeling a Two-Family House

From A. W., Herman, Minn.—We have a building 22 x 50 ft. in plan, the roof being nearly flat and with no eaves. How can we make a neat looking, conven-



Remodeling a Two-Family House

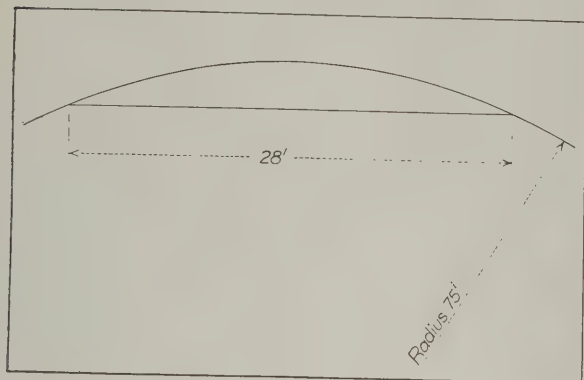
ient two-family apartment house, each family to have four rooms? We would like to make it look as near as possible like a bungalow. We will place it on a corner lot and have entrances from each street, something after the rough sketch here presented.

Striking Segment of Circle Having a Long Radius

From Anonymous, Norwich, N. Y.—Some time ago I had to strike a segment of a circle having a radius of 75 ft. and a chord of 28 ft., but I had no room in which to strike so long a radius. The following, however, is the manner in which I accomplished my purpose:

I took $\frac{1}{4}$ of 75 ft. or 18 ft. 9 in. as a radius and

struck an arc. I took $\frac{1}{4}$ of 28 ft. or 7 ft. as a chord. Then I divided the 7 ft. chord into seven parts for the sake of convenience and erected perpendiculars extending to the circle. I then laid off a line 28 ft. long and divided it into 7 parts, erecting perpendiculars and extending them indefinitely. I set the dividers the length of each perpendicular and stepped off four times on the corresponding perpendicular for the large circle.



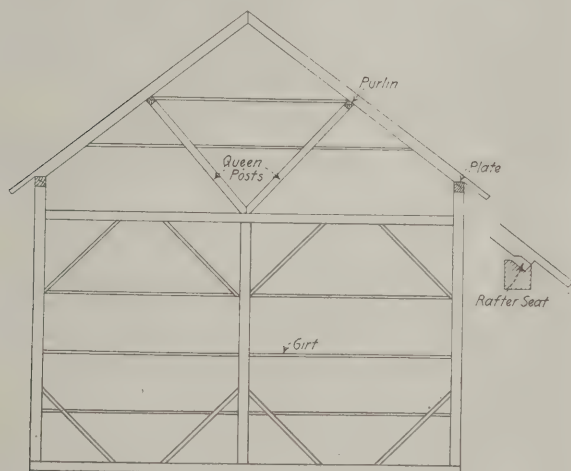
Striking Segment of Circle Having a Long Radius

After all had been stepped off I took a thin edging and bent it around the points marked and drew the line. If care is used in the measurements the result will be a circle as true as one could strike with a line and a 75-ft. radius.

Strength of Barn Framing

From D. P. B., Redford, N. Y.—In answering the query of "W. J. T.," Cameron, Neb., which appeared in the October issue, I wish to say that his sketch is the frailest thing I have seen in any structure. The walls must bulge as the roof sags. Spruce poles 6 in. at the top are too light, even for rafters for a barn of that size, to say nothing of white cedar.

The 20-ft. posts should be at least of 10 x 10-in.



Strength of Barn Framing—By "D. P. B."

spruce, hemlock or Southern pine. I clung to the side-walks one day in Lincoln, Neb., in an 80-mile gale, but the barn of "W. J. T." would stand about five seconds in that zephyr. Girders, queen posts and purlins are not in the way for any use for such a barn.

I enclose sketch showing bent of a properly built barn which may be of interest to the correspondent in question. As will be seen by the end bent the queen posts are not in the way of a hay fork.

The location of the girts may be varied to suit the length of timber for vertical boarding. If a hay fork is used and hay unloaded from the outside the girts between the queen posts will be left out and the opening closed with a door on weights.

Design Wanted for Cabinet for Guns and Fishing Rods

From R. A. G., Natic, Mass.—I would like it very much indeed if some of the interested readers would furnish for the Correspondence columns a design for a gun cabinet—something that would hold two or three guns, a few fishing rods and some of the smaller articles that go with them. Some simple design with a few details of construction would be greatly appreciated.

Demolishing the Old Astor House

For some little time past workmen have been engaged in demolishing the southern portion of the historic Astor House at Broadway and Vesey Street, New York City, in order to permit of a line of the new subways to be carried beneath it. Since it was erected in 1836 it has been one of the prominent buildings of this city and it is probably safe to assume that few of the many spectators who daily watch the progress of the work of demolition have given thought to the destination of the material composing the old hostelry.

Windows, doors, timbers, plumbing, brick, stone and every possible salvage from the old Astor are being carted away to all points of the compass to begin a new existence in modern structures. Even the lath are saved for further use.

Second-hand building material dealers in the Bronx, Brownsville, Queens and New Jersey are carting brick and other parts of the structure to their yards to be resold for new building operations. The blue Quincy granite blocks forming the façade of the structure are going in truck loads to a Brooklyn firm, which is to convert the blocks into monuments and tombstones.

We understand that the wrecking company which bought the Hotel from the city paid \$3,883 for it and has already sold the granite for \$5,000 and is disposing of the 800 or 900 loads of brick which the portion of the building that is being demolished is estimated to contain, for several dollars per load.

Sometimes in tearing down old buildings some rather unusual features of construction develop, and in the demolition of the southwest wing of the Astor House it was found that the four upper stories were suspended by iron rods from rafters in the roof. The reason for this construction is thought to have been due to the fact that the dining-room on the second floor, measuring about 40 by 60 ft., was so large that the builders could not secure rafters long enough and sufficiently strong to reach across it and form an adequate support for the floors above. The consequence was the builders devised a series of supports built like roof trusses in the partition walls on each floor and from these they suspended the iron rods, increasing their number as they descended. This method of building over a large hall was apparently fairly common before the days of steel construction. The wreckers of the Astor House, not daring to remove the rods for fear the whole structure would fall, were obliged to shore it up from underneath before they proceeded.

Another feature of the old historic building is found in the stones forming the cornice at the top. They were laid with the greatest part of their surface projecting over the street, so that the wreckers had to shore them up on beams projecting from the windows of the top story and then slide the stones back. Some of these cornice stones weighed as much as 7 tons apiece, and they had to be cut in two before they could be lowered to the street.

The most common question asked a housewrecker by the layman is "What is the first thing you do when you start tearing down a building?" The reply is that the cellar is first cleaned out, saving everything that can possibly be of value so as to use the cellar as a general

dumping place for the rubbish of the whole building.

The men then begin tearing off the roof, attacking both ends of the building simultaneously and proceed downward. They turn off all gas and electricity before doing this and usually leave the water turned on so as to use it for laying the dust while the demolition is in process.

Architects and Engineers Visit Plant of American Rolling Mill Company

Nearly 200 members of the Cincinnati Chapter of the American Institute of Architects and of the Cincinnati Engineers' Club were guests of the American Rolling Mill Company on the 8th of October. The party left Cincinnati on a special train in charge of G. F. Ahlbrandt, assistant sales manager, and a buffet lunch was served en route to Middletown. Early in the afternoon they reached the old Central Works of the American Rolling Mill Company and the visitors were welcomed by Secretary R. C. Phillips, who in a few well-chosen words assured the guests that the company would take great pleasure in showing them through the entire works and research laboratory.

The guests were divided into parties of fifteen each and a competent guide placed in charge of each party. They were carefully conducted through the various departments of the works and they witnessed the manu-



Architects and Engineers at the American Rolling Mill Laboratory

facture of American ingot iron from iron ore, pig iron and selected raw materials to plates, sheets, roofing, culverts, silos, terne plate, etc. The pouring of a heat was of great interest to many who had never seen this operation. The handling of this heat through the blooming mill, bar mill, sheet mill, annealing, pickling and galvanizing departments was carefully followed by the guests and they were impressed with the care exercised in each department in the manufacture of this pure iron.

The party was then conducted to the Research Laboratory, which is said to be the best equipped iron and steel research laboratory in the country to-day. The visitors were shown the different methods used in the testing of iron and steel, each method being explained by a competent engineer. At this point Mr. Charls, the assistant secretary and general sales manager, gave a talk on "Quality" in iron, showing what effect this has on the rust-resisting properties of iron and steel. After taking a photograph of the entire party the guests were returned to Cincinnati, light refreshments being served on the train.

A house built for comfort is said to center around its open fireplace.

New Publications

The Architects' Directory and Specification Index.—Size, 7 x 10 in.; 204 pages. Bound in board covers. Published by the William T. Comstock Company. Price \$3.00 postpaid.

This is the tenth edition of a well-known directory of architects and is the result of a careful recompilation of the entire list. Many names appearing in the old editions have been eliminated because it was impossible to verify the addresses or secure a response to communications. The additions in the present work consist of a short list of the architects of Mexico and the names of some in the Philippine Islands.

The work embraces a list of architects of the United States, Canada, Cuba and Mexico, classified by states and towns; also a list of landscape and naval architects of the United States and Canada; architectural societies and organizations of the world; architects of the boards of education in the principal cities in the United States and Canada; officers of the building departments in the principal cities, together with state boards of examiners of architects.

In addition to the above there is a Specification Index of prominent dealers and manufacturers of building materials and appliances.

Not the least interesting feature of the work is a selected list of architectural, scientific and technical books, together with the announcements of leading building and architectural papers, conspicuous among which is that of *The Building Age*.

Features of the New Equitable Building

Some interesting statistics regarding the new Equitable Building, now under way on the site of the old structure in lower Broadway, New York City, will convey in a measure at least the magnitude of the undertaking. Among other things there will be required 33,000 barrels of cement in the foundations, 120,000 cu. ft. of

cement in the building itself, 1,215,000 cu. ft. of broken stone, 168,000 cu. ft. of terra cotta, 4,000,000 hollow tiles, 350,000 sq. ft. of marble trim and material for flooring, 1,350,000 cu. ft. of sand and 17,500,000 common brick. This estimate is about 5,500,000 more brick than was required for the Pennsylvania Railroad Terminal and about 10,000,000 more than was used in the construction of the twin Hudson Terminal buildings. There will be 152 steel supporting columns, the weight of the heaviest of which will be 32 tons. The structural steel work will require 18,000 gal. of paint to coat it.

There will be 50 elevators in the building so arranged that if a firm occupies several floors it will have its own private elevator. All the elevator shafts will be enclosed in brick and will have fireproof doors. The stairways, enclosed completely in tile or brick, also have fireproof doors. The building will contain 5,000 windows and all offices will have washbasins with hot and cold water connections.

A 115-foot lookout tower in the Sitgreaves national forest, Arizona, just constructed by forest officers, was built entirely of logs and without the use of hoisting machinery other than ropes and tackle blocks.

A GREATER NEED FOR SKILLED MECHANICS

An All-Important Problem for the Builders of the Country—How a Continuous Supply of Skilled Mechanics May Be Secured

By JOHN A. KELLEY*



THE most important of all problems before the builders of this country, to my mind, is that of securing a continuous supply of skilled mechanics. It is a generally recognized fact that good mechanics in all lines of the building trades are becoming scarcer every day. Any contractor will tell you that the good men are hard to find and that they demand more pay and do less work than ever before. The reason is that an artificial monopoly has been created on account of the lack of men, largely due to the practice of limiting the number of apprentices thus making it difficult for the American boy to learn a trade.

One of the Remedies Suggested

There is just one remedy, to my mind, for this condition and it may take years to educate the public to the necessity of it. The trade school will solve the problem. The trade school must come to be one of the most important factors in our general scheme of education. The trade school in the United States is in its infancy but if we are to develop or maintain industrial supremacy we must develop these schools to their utmost capacity. The manufacturers of the country have recognized this fact and The Builders' Exchanges are now beginning to take it up.

At the last session of the Ohio State Association of Builders' Exchange the writer introduced a resolution calling upon the legislature of Ohio to establish a trade school at the Ohio State University. The convention passed it unanimously and heartily endorsed the proposition. I did not believe for a minute that we could get any action from the legislature at the time, but the resolution brought to the attention of the public the fact that the builders are crying for mechanics and can not get them. The resolution referred to the rapidly increasing cost of labor in the erection of a home, due to the lack of skilled mechanics. Of course, the legislature did nothing but we did our best to get the attention of the public in the matter. A committee from the Columbus Builders' Exchange recently appointed a committee to co-operate with the Board of Education in the sale of an old building now used as a trade school with the idea of erecting a larger structure where the development of the school may be pushed.

The Trade School a Boon

For that great army of young men who quit school at the age of 14 and 15 years the trade school is a boon, and statistics show that about two-thirds of the boys and girls leave school at about this age. The trade school attracts them. They have not succeeded very well in mastering grammar and do not like literature and can't see how they are going to earn money on anything that they are taught in the public schools. They are not being guided toward any vocation and probably pressure is being brought to bear on them at home. Those boys should have a chance to learn a trade. They should be urged to go into the trade school where they may be taught something useful and

something at which they know they can earn good money after having mastered the trade. How much better off they would be, also the world at large.

Now these trade schools may develop brick layers and carpenters and plumbers and painters, just as well as electricians and machinists. In fact it is much easier to teach the building trades than it is the more technical branches. A boy may not have a natural knack to lay brick, but if he is a strong husky kid and knows how to use his arms he can usually get the knack in a short time. Many a brick layer has been taught the trade in a barn or a cellar, so why would it not be just as easy to learn in a big, well-lighted properly equipped trade school room? We are trying to get such a school here in Columbus but the Board of Education and especially the Superintendent fears the attitude of the union in the matter. However, the printers' union is very strong here and one of their own men is teaching the printing trade to the boys in this same school.

The unions have not been loud in their praise of the trade schools, to be sure, but they have not opposed them. The trade school is for the development of the American boys, the sons of the union men as well as of non-union men; the sons of the poor and the sons of the rich. To fight the trade school is to fight the right of a boy to learn what he pleases and that would be un-American. No, I do not believe the unions will strongly oppose the development of the trade school. This has been indicated by the tolerance of the unions and by their help, in many instances.

Attitude of the Builders' Exchange

I know that the Builders' Exchange of Columbus would not care one bit whether a boy joined a union or not after leaving a trade school. The contractors want the men and they are willing to pay whatever a man is worth. The contractors want more men and more intelligent men and men more willing to do a day's work. It does not make any difference to them whether they belong to a union or not. In fact, many of them would prefer to hire a union man, all things being equal. Efficiency is what is wanted and it will be a happy day when the trade schools begin to turn out bright young men, who can read plans and know how to start a job and lay brick as well.

In Gary, Ind., the trade school is developed perhaps to a greater extent than in any other city. The boys there are taught carpentry, painting, plumbing and the like. The repair work on all the schools is done by the boys of the trade school. The cost of upkeep of the schools is reduced to a minimum in this respect. The boys also make all the school desks. There is no reason why such a trade school should not be in operation in every city in the United States. It is up to the Builders' Exchanges to see that the building trades are taught in these schools. Mechanics are certainly scarcer in the building trades than in any other business and the building business is the biggest of all.

Usually a Board of Education responds to public opinion quicker than any other body of men in public life. If the proposition of developing the trade schools is being pounded into their systems by hard-working committees and by public notices inspired by an organization of builders, the members of the board will respond, sooner or later. It will take hard work in

*Secretary Builders' and Traders' Exchange, Columbus, Ohio.

some cases and in others it will be easy. I certainly believe, however, that it is the duty of every Builders' Exchange to help in the development of these schools. Furthermore, now is the time to start work for it will take several years to feel the effects of the new life being poured into the trades, even if there is a brick-laying, carpentry, plumbing and roofing department in every trade school in the country.

The ordinary school teacher throws up his or her hands in horror at the thought of making tradesmen out of our school children. Yet these teachers in one year are driving more children out of the schools without a trade than the trade schools could turn out in the next ten years, operating day and night. If we make electricians and clay workers and farmers at our universities, why not make roofers, brick layers and carpenters of the children who cannot afford to go to the university. An electrician leaving college goes with an electric trust and gets \$60 per month for the first year or two and if he reaches \$150 per month he is doing fine. But a brick layer goes on the wall and earns \$5 to \$7 per day and works only eight hours.

I believe that every town and every city should have a trade school and every university should have a technical school where any or all branches of trade may be learned and then the taxpayers will begin to get the worth of the billions of dollars being expended upon education in this country.

Royal Architectural Institute of Canada

At the sixth annual convention of the Royal Architectural Institute of Canada held in Calgary in September, the principal business considered embraced certain amendments to the by-laws together with a proposed code of ethics and schedule of minimum fees and regulations governing competitions.

The election of officers resulted in the following choice:

President.....J. H. G. Russell of Winnipeg
Vice-Presidents...R. W. Lines of Edmonton
 M. Ouillette of Quebec
Secretary.....Alcide Chausse of Montreal
Treasurer.....J. W. H. Watts of Ottawa

The reports showed the Institute to be in good financial condition with a total membership of 558, of whom 491 are active members.

Death of Robert Maynicke, Architect

Robert Maynicke, of the architectural firm of Maynicke & Francke, reference to whose work has appeared at intervals in these columns, died in his 65th year on September 29 at his country place near Bedford Hills, in Westchester County, N. Y.

His professional career is more or less notable because he was largely instrumental in advancing some of the leading architectural tendencies which developed during that time. His firm designed the 12-story New York Commercial Building, at Broadway and Waverly Place, which is said to have been the first mercantile structure in which freight and passenger elevators were segregated. More recently the firm has given attention to developing the structural and artistic possibilities of reinforced concrete. Since its organization in 1895 the firm has designed nearly 100 buildings, of which a large percentage has been mercantile structures.

Mr. Maynicke was a Fellow of the American Institute of Architects, which he represented on the Board of Building Examiners of the City of New York; was a member of the Municipal Art Society, of the Architectural League, the Sculpture Society and of the New York Athletic Club.

Warm Air Furnace Capacities and Pipe Sizes

In the article which appeared in our last issue on page 480 under the above heading an annoying typographical error crept in which, although obvious to the careful reader, is of such a nature that we feel attention should be called to it.

In the next to the last paragraph in the second column the article says "Another rule is to give one square foot of pipe area for every square foot of glass," etc. This should read "one square *inch* of pipe area for every square foot of glass," etc.

New York's Latest Hotel

If present plans are carried to a successful conclusion a 24-story hotel to contain 1,800 rooms will rise on the site now occupied by the New York and Criterion theaters on the east side of Broadway between 44th and 45th streets, New York City, and which will represent an investment of something like \$12,000,000. The plot has a frontage on Broadway of 203.9 ft., 165 ft. on 44th street and 195 ft. on 45th street.

The architects of the proposed hotel are Walker & Gillette who estimate the actual cost of the building itself at \$6,600,000. Demolition of the theaters on the site will be commenced some time in October, and it is expected that the structure will be ready for occupancy by the close of 1914.

Besides the 24 stories above ground there will be three basements and sub-basements, thus giving the hotel a total of 27 stories. The two lower basements will be used for the power plants including a private electric lighting plant, laundry, boiler and engine rooms. In the basement proper will be an immense grill—a circular room about 80 ft. in diameter, which will occupy the larger part of the front portion of the basement on the 45th street side. Connected with the grill will be five private dining rooms. The kitchen will be about 200 ft. wide and about 120 ft. deep. There will be three entrances to the hotel, the main one on Broadway in the middle of the block and one each on 44th and 45th streets. The lobby will be one of the striking features of the house, as it will run up to the third story, surrounded on the upper floor by artistic balconies. On the roof will be a large pent house for the accommodation of the hotel help.

The exterior of the hotel will be finished in white. For the first five stories on the Broadway street front limestone will be used and above this will be glazed terra cotta and light brick. The design will be in the French renaissance style of architecture.

The property to be improved has an interesting history. Oscar Hammerstein built the New York Theater in 1895, calling it the Olympia, and for a time it was the wonder of New York City, containing as it did a music hall, a theater, a concert hall, a roof garden and billiard parlor. Mr. Hammerstein, however, was a little ahead of the times and the New York Life Insurance Company, which held mortgages on the property instituted foreclosure proceedings and in 1898 bought it in for \$967,400. A few years later the property was bought by Henry B. Sire for \$1,010,000, but he evidently found it a white elephant, and several years ago Klaw & Erlanger, with other interests, took over the property in the name of the New York Theater Company.

The contract for the new building has been awarded to the Wells Construction Company, and the hotel will be built and managed by a syndicate known as the Century Holding Company.

Tacoma, Wash., is said to lead the world in the fir door trade, the business amounting to millions of dollars.

PLAN FOR A SMALL FACTORY BUILDING

A Three-Story Brick Structure Designed for Light Manufacturing Purposes—Some Interesting Details Relating to Construction

By PAUL T. LESHER

IN the accompanying drawings I have outlined a building that will be found suitable for light manufacturing purposes and which I submit for the benefit of the correspondent "G. S. C.," Philadelphia, Pa., who made request for such a plan in the last issue.

Brick has been used for the walls instead of hollow tile or concrete blocks, as the writer is of the opinion that ordinary brick will be more economical than the other materials and make an attractive building.

The structure has been designed to conform to the building laws of the city of Philadelphia, which require for a three-story manufacturing building 17-in. walls

The ends of the floor beams running into the brick walls at the second and third floors should rest on steel bearing plates. Ordinary stirrups purchased in the open market can be used for connecting floor and roof beams to their respective girders.

Fig. 2 shows the plan of the second and third floors, giving the spacing of the columns and beams. The roof beams and girders are spaced to the same dimensions as for the floor beams. Cast-iron column caps should be designed to allow floor and roof girders to have a good bearing, also a cast-iron column base with a bearing surface 2 ft. square is required for the first-



A Plan for a Small Factory Building—Fig. 1, Front Elevation—Scale $\frac{1}{8}$ In. to the Foot

for the first and second stories and 13-in. walls for the third story. The Philadelphia law states that a roof load of 30 lb. per sq. ft. shall be used, also a live floor load of 120 lb. per sq. ft. to be used in designing, and these loads are the ones adopted for this building.

Fig. 1 of the sketches shows the front elevation of the structure and Fig. 3 a cross-section through the building in elevation, giving the size of roof and floor beams, size of columns for the different floors as well as of brick walls and foundations.

The foundations are shown made of concrete, but brick or rubble masonry can be used, and should be laid in cement mortar.

The roof has a pitch of $\frac{3}{4}$ in. to one foot and is covered with a five-ply coal-tar pitch felt and gravel roof laid on $1\frac{1}{4}$ -in. tongued and grooved sheathing. The floors are made of $1\frac{3}{4}$ -in. tongued and grooved stock.

story columns, size of bearing surface of base should be 2 ft. square.

The first floor is constructed by putting down a 6-in. layer of cinders and then covering them with a 2-in. layer of tar concrete, laid while hot. In this concrete nailing strips are imbedded to which a 2-in. floor of roof boards are spiked. Upon this rough floor is then laid a finished floor of $1\frac{3}{4}$ -in. boards. The outside of the building is the same on all sides, as the structure is square, with the exception of the door, which is to be located on one side only, the other sides having windows at that place. The outside door should be made large enough to pass through it all the supplies and machinery that will be used in the building.

At a certain point in the second and third floors it might be necessary to space the beams differently than shown in Fig. 2, so as to be able to hoist the machinery

from the first floor to the upper floors, or provide a large door in the outside wall at each floor.

As the level of the first floor is 3 ft. below grade, it is necessary to provide a wall around the entrance and so made that no water from the grade level will wash down to the first floor. Steps to the floor level from grade will also be necessary.

If this kind of entrance is not desirable it might be better to enter the building at the second-floor level

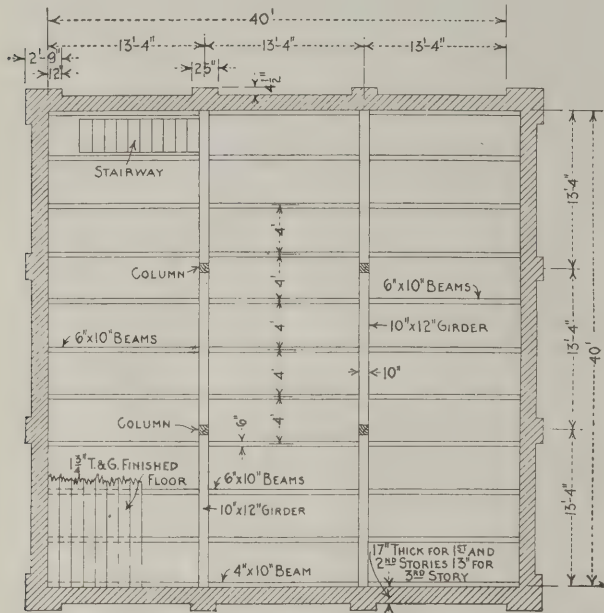


Fig. 2—Plan of Second and Third Floors—Scale 1/16 In. to the Foot

and have steps going up from grade level.

The windows at the second and third stories are ordinary standard lifting sash windows and I would suggest, owing to the necessary small height of the first-story windows, that these be made pivoted sash.

The entrance door can either be made a swinging or sliding door.

The outside surface of the concrete wall foundation should be coated with coal-tar pitch to keep moisture from coming into the first floor.

Number of Buildings in Greater New York

Some interesting statistics are disclosed in the annual report of the Tax Department of Greater New York, which was issued a few days ago in book form. They show that there are more buildings of all kinds in Brooklyn than there are in the Boroughs of Manhattan, the Bronx and Richmond combined. The official figures give: Brooklyn, 168,454 buildings; Manhattan, 85,678; the Bronx, 33,708; Queens, 59,192, and Richmond, 19,508, making a grand total for Greater New York of 366,540.

Tenement houses, by which is meant buildings having housing accommodations for three families or more, number in Brooklyn 44,754, and in the Borough of Manhattan 40,551.

As might naturally be supposed, Brooklyn is far in the lead as regards two-family houses; in fact, more than half of the two-family dwellings in the entire city are in that borough, the number being 48,577 out of a total of 73,714 in Greater New York.

Of one-family dwellings there are 147,184 in Greater New York, of which number 61,303 are in Brooklyn.

Forest Products Exposition

Announcement is made that the First Annual Forest Products Exposition will be held in the Coliseum, Chicago, April 30 to May 9, and in the Grand Central Palace, New York, May 21 to 30, 1914. The scope and purpose of the Exposition is far reaching and highly educational, including all branches and details of the lumber, wood product, wood working, forestry and allied interests, demonstrating clearly the uses, methods, advantages and permanency of the commodity.

Rapid Building Construction

A new record for rapid building has just been established in Morristown, N. J., where Hosmer P. Smith erected in one day a stable building 148 ft. long, 14 ft. wide and one story high. It appears that a few days previously one of the stables used by the Morristown Field Club for the horses of the Horse Show was burned to the ground, and it was necessary to replace it with a new one as quickly as possible.

Mr. Smith assembled his fifteen men and had the material on the ground to begin operations by 10 o'clock

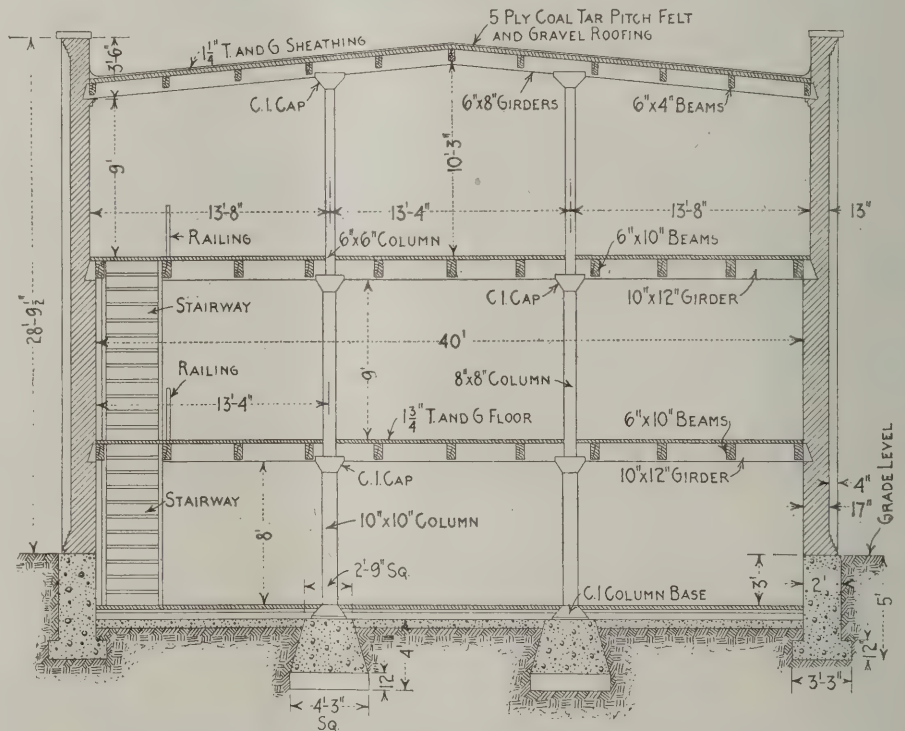


Fig. 3—Vertical Cross Section Showing Construction—Scale 3/32 In. to the Foot

A Plan for a Small Factory Building

in the morning of the day in question. At 3 o'clock the last rafter was nailed in place, while three sides of the building were boarded up and the work was well advanced on the fourth side. The men worked until 6:30 o'clock, when the roof boards were in place ready for the final covering.

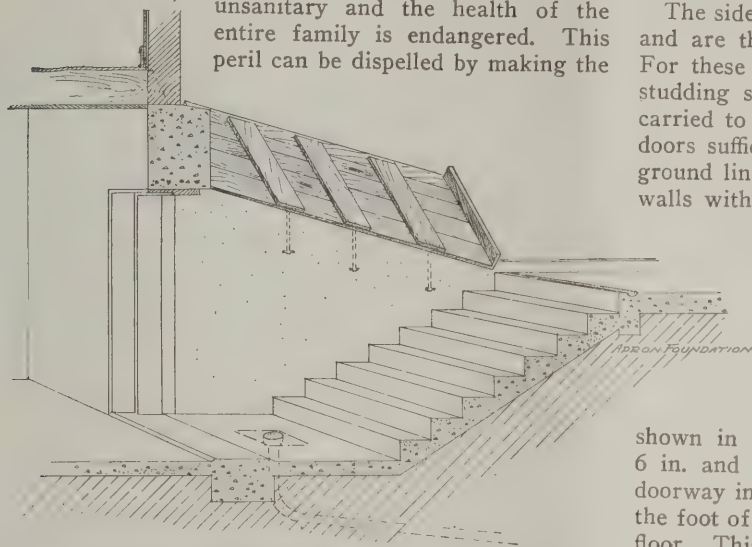
The next morning the roof was completed, partitions and stalls set, and by noon the stable was ready for the Horse Show. Mr. Smith was highly complimented upon the speed with which the work was done.

BUILDING CELLAR STEPS AND HATCHWAY

How Permanent Steps and Water Tight Walls for the Cellar Hatchway of a Dwelling House May Be Constructed of Concrete

By PERCY H. WILSON

EVERY one knows that the cause of many a case of sickness is due to a damp cellar under a dwelling house and often this dampness is the fault of a poorly built entrance-way. If water gains access by means of leaky hatchway walls, the cellar becomes unsanitary and the health of the entire family is endangered. This peril can be dispelled by making the



Building Cellar Steps and Hatchway—Section Through the Entrance Showing Construction

walls and steps of concrete, as indicated in the sketch, which shows so clearly how the work is done that extended comment is not needed.

The methods of building hatchways for either new or old cellars are very similar. With an allowance for a three-foot landing at the bottom of the stairs, excavate the opening to the width of steps desired plus one foot. This extra width is for a six-inch thickness of concrete wall on each side. The steps themselves have a rise of six and a tread of nine inches. Beneath the steps proper is a four-inch thickness of concrete. Therefore provide for this thickness in sloping the ground upward from the landing to the top of the stairs. Extend the trenches for the side and end walls one foot below the concrete of the steps. As forms choose two 1 by 12-in. boards and notch them as though they were to be used as "horses" to support wooden steps of the same dimensions as those of concrete. Place the notched edges down with the ends fixed at the top and bottom of the stairs. To mold the rise of the concrete steps, use 1 by 6-in. boards 3 ft. 10 in. long, which are secured to the forms by means of nails and wooden cleats.

With the forms firmly fixed in position, fill the mold for the bottom step, and the space back of it, with concrete proportioned 1 bag of Portland cement to 2 cu. ft. of sand to 4 cu. ft. of crushed rock. If bank gravel is used, mix the concrete 1 part cement to 4 parts gravel. Bring the concrete in each step to the top of the riser and finish the surface with merely a wooden float. Continue the work upward until all the steps

are finished. At the top of the stairs tie the apron foundation to the side walls by means of old iron rods imbedded in the concrete and extending around the corners. This will prevent possible heaving and cracking by frost.

The side forms of the six inch walls are then erected and are thoroughly cross-braced against each other. For these forms use 1-inch siding on 2 by 4-inch studding spaced two feet apart. The walls can be carried to any height desired so as to give the cellar doors sufficient slope for shedding rain-water. Above ground line, outside forms must be provided. Fill the walls with concrete mushy wet. Before the concrete sets, bolts are placed (heads down and washered) in the top of the side walls for holding the wooden sills to which the cellar doors are hinged. After two to four days the forms can be removed. Connect up the drain in the landing and lay the landing floor.

The eight cellar steps of the hatchway shown in the plan have a tread of 9 in., a rise of 6 in. and a length of 4 ft. The clear height of the doorway in the cellar wall is 6 ft. 6 in. The landing at the foot of the steps is 3 x 4 ft. and has a 4-in. concrete floor. This same thickness of concrete lies under the steps proper. The side walls were built as described above. For this improvement there were required the following quantities of materials:

Bill of Materials

Crushed rock.....	2½ cubic yards
Sand	1½ cubic yards
Portland cement ..	12 bags

For improving old cellar hatchways it is frequently necessary to fill with earth and gravel so as to provide



Perspective View Showing Hatchway Completed and the Doors Thrown Back

the earthen slope for the concrete steps. Such filling must be well tamped into place, should be water soaked and allowed to settle before the steps are built.

Concrete steps, unlike other kinds, become stronger with age. They are perfectly safe under the heaviest of loads. Moreover, besides being water-tight, they keep out rats, mice and other obnoxious vermin.

Some Things a Boy Should Know About Woodworking

What a boy ought to know about woodworking on entering high school after two years' elementary technical training is told by Joseph Berg in a late number of the *Manual Training Magazine*. He says the boy will be properly informed and make a good student if he knows:

How to read a rule (not ruler).
 How to add and subtract fractions of an inch.
 That sandpaper is graded numerically, the average being No. 1.
 The correct method of tearing sandpaper.
 That a block should be used when sanding flat unfinished surfaces.
 That sandpaper should be torn into rectangular pieces to fit block.
 That a sandpaper block should always be of soft wood.
 That no sanding should be done until all tool work is finished.
 That worn sandpaper becomes useful later.
 To call a bit by name and size.
 That a bit is not a bore.
 That a bit is not a drill.
 That the figure "9" on a bit means 9-16 inch, Not No. 9.
 That a brace is not an "auger" or "borer."
 That bits should never be filed on outside.
 That bits should never be filed by pupils.
 That direction should not be reversed when drawing out bit.
 That a properly filed bit needs little pressure.
 That holes are generally measured center to center.
 That the use of a file be avoided wherever possible.
 That a file when used cuts only one way.
 That grinding without water heats to a blue and destroys temper.
 That "sharpen" does not mean "grind."
 Never use center of oilstone or grindstone for narrow tools.
 That flat side of plane blade or chisel should never be ground.
 That flat side of plane blade or chisel should never be raised when Whetting.
 To lay the plane on its side to avoid dulling blade and cutting bench.
 That the cap iron, for bench work, should be set about 1-16 inch from edge.
 That a modern iron jack-plane is not a scrub-plane, as the old-fashioned wooden one was.
 That the plane should not be held diagonally, except when cutting across the grain.
 That good work is impossible with dull tools.
 That the scraper should be reserved for curly grained wood.
 That the sharpening of a scraper should not be done by pupils.
 How a rip-saw differs from a crosscut-saw.
 That the number on a saw indicates number of teeth per inch.
 That a rip-saw is not always numbered 8 and a crosscut-saw, 10.
 That the hack-saw be reserved for close work.
 That it is necessary to have a line squared across two adjacent faces to cut off square.
 That no time or labor is saved by sawing around the piece.
 That a large chisel will do better work than a small one.
 That chisel across the grain is possible and correct in many cases.
 That a mallet should not be used except for heavy duty.
 To watch the chisel edge, not the handle, when using mallet.
 That mallet or hammer should be held one-third the handle length from end.
 That a bevel should not be called a "bevel square."
 That gage and square are useless if not used properly.
 That they should be held firmly against the work when testing or gaging.
 That the gage point should be filed like a knife edge and should actually cut a line.
 That the gage point should not project beyond 1-16 inch.
 That the gage should be tilted slightly in direction of motion.
 That a screwdriver should never be sharpened like a wedge.
 How to determine size of a nail or screw.
 That "12 D" means 12 penny and is about 3½ inches long, etc.
 That screws have a gage (diameter) as well as length.
 That screws should never be driven without first boring through top piece.
 That size of bit is determined by gage of screw.
 What "toe-nailing" means.
 That a nailset is not a punch.
 That a handscrew is not a clamp.
 How to adjust a handscrew.
 That a vise will hold the work without placing entire weight on handle.
 That Le Page's glue is only one kind of glue.
 That "the more glue, the stronger" is a mistaken idea.
 That a loose joint with much glue is weaker than a tight one with less glue.
 That a thick glue is worse than none.
 That shellac does not dry in half an hour, as is generally believed, it merely sets.
 That shellac must be thin and applied quickly.
 That the work must be handled the same day, if possible.
 That wood filler is not intended to fill bad joints and ruts on surface.
 That "Sawdust and Glue" is a poor workman's motto.

An Interesting House Moving Operation

A house moving operation involving features of value to the contractor occasionally called upon to execute work of a more or less similar nature has recently been carried out in Philadelphia where the major portion of the building constituting the Nurses' Home of the University of Pennsylvania Hospital was transported a distance of 256 ft. As originally situated the north wing of the building faced on Spruce Street and the east wing extended south to Pine on 34th Street. The portion moved weighed 1025 tons; measured

45 x 86 ft., was 45 ft. high, and it was necessary to cut it away from the remainder of the building. By reason of the extreme care necessary the cutting of the wall occupied the workmen more than a week. Over each joist the remaining wall had to be dug out so that the joists would not be injured as they were to be used again with the building in its new position. Owing to the conditions existing it was necessary in the process of moving to turn it completely around.

In preparing to move the structure it was raised 18 in. when the original foundations were removed and temporary movable ones put in their place. Heavy timber "needles" were then run through holes made in the foundation underneath the joists at a distance of every 3 ft. One set was run the short way of the structure and another set underneath was run the long way. Jack timbers were also placed under, running the short way of the building and a foundation cribbing built. Each cribbing was placed 6 ft. apart and two jack screws placed on it, giving a total of 160 jacks, each of which was capable of lifting 20 tons. When ready for operations one man was placed at every 14 jacks and upon a whistle signal of the foreman, each man gave his 14 jacks in succession, one turn. This process was repeated and continued until the height of 18 in. had been attained.

When the building had reached this height the wooden tracks were placed in position, these consisting of timbers of great weight and strength. Steel and rope cables were run out from the building and buried securely in the ground. These were attached to a crab or capstan operated by horse power.

More Skyscrapers for New York City

The lower end of Manhattan Island will in due time witness the erection of an important addition to the colony of skyscrapers which cluster in the vicinity of old Trinity Church. This latest sky piercing office building will rise on the site of the former plant of the American Bank Note Company on Trinity Place just across from the rear of Trinity churchyard. The plans have just been filed for a 35-story office building, the estimated cost of which is placed at \$3,500,000. It will have a frontage on Trinity Place of 124.10 ft., on Greenwich Street of 177.8 ft. and it will have a depth of 181.4 ft. According to the plans of Howells & Stokes, the architects, the main structure will be 28 stories high, surmounted by a tower which will be seven stories, giving a total height of 475½ ft. Of this total the main structure will be 374 ft. and the tower 101½ ft.

The tower will be pyramidal in shape and will be ornamented with terra cotta. The building will be known as the "Trinity Tower," and will be finished inside with fireproof wood and have reinforced concrete floors. It will be equipped with 20 passenger elevators. It is probable that the building will not be erected for some little time, as it is thought that the filing of the plans is merely a precautionary measure in view of the possible building height limitation.

A few days ago plans were filed with the Bureau of Buildings of the Borough of Manhattan for the construction of a 22-story office building at the northwest corner of Whitehall and State Streets, the building to have a frontage of 131 ft. on the former and 123.9 ft. on the latter thoroughfare and running through to Pearl Street, where it will have a frontage of 39.1 ft.

It will have a façade of brick and terra cotta with a mansard roof. The main building, which is to be on the northwest corner of Whitehall and State Streets, will be 22 stories high, while the part on Pearl Street will be two stories high, thereby protecting the light of the taller building. The architects, Starrett & Van Vleck, 45 East Seventeenth Street, New York City, have placed the cost at \$700,000.

BUILDING ON THE PERCENTAGE BASIS

Some Interesting Comments by a Well-Known Superintendent of Construction Based Upon His Own Practical Experience

By ERNEST McCULLOUGH

IN the issue of the paper for October E. M. Birchler, Milwaukee, Wis., takes exception to a statement made by a previous correspondent when the former said the percentage basis for contracting is only a present-day craze. The writer agrees with the first cor-

respondent because of an experience extending over some 27 years in a number of states from Massachusetts to California and from Mexico to Canada and Alaska.

The advantage of the percentage system is that an owner can have his buildings



erected just as he wants them without having bills for "extras." The extras are there, of course, but they are not shown in the expense account in an offensive way. In 1892 the writer in the *Engineer and Contractor*, of San Francisco—a paper not now in existence—made a plea for a method of contracting based on the doing of work as described by Mr. Birchler. So far as he knows it was the first time this method was ever described in print, although it was used by many railway companies and large corporations.

Method Fair to All Interests

He was employed by a firm of contractors the following year to do some work on that basis and he again described the method in a series of articles he wrote for the *Contractor*, Chicago, in 1905 entitled "The Business of Contracting." The method is eminently fair to all parties, but this mention by Mr. Birchler is the first the writer has seen outside of his own articles above named. In talking with contractors he has found very few who ever heard of it. For several years the writer was a superintendent of construction for a contracting firm on the following basis: He received a monthly salary for his general services. He designed their work and made a careful estimate of the probable cost, without profit. To this estimate of cost was added 10 per cent. and then bids were invited from sub-contractors and other general contractors. If the lowest bid came within 15 per cent. of the estimated actual cost, thus allowing the contractor a 15 per cent. profit over the company's cost estimate, that contractor received the contract. If the lowest bid, however, exceeded the estimate of cost by more than 15 per cent., the company did the work with the writer in charge. The amount fixed in the estimate of cost, plus 10 per cent., was set aside as a construction cost. If the work was done inside the construction cost the writer received in addition to his regular salary one-third the saving. He believes there are several companies to-day having similar arrangements with their chief engineers and superintendents.

Close Estimate Required in Advance

It will be noticed that such a method requires an exceedingly close estimate in advance. This program can

only be carried through by holding close to the work as planned and cutting out all "extras." In other words, it becomes again the old-style lump-sum-contract, with a bonus to both owner and contractor for time and money saved.

The usual percentage system of contracting is totally unlike this and the principal reason for its existence is the desire of the owner to have a building erected just as he wants it without any bills for "extras." He wants to be free to make all changes he desires as the construction proceeds and this cannot be done under any system that involves a close cost estimate in advance. Under the percentage system as usually conducted only the most general idea is had of the cost in advance.

The writer resigned from two jobs where this usual percentage cost method was followed because of the indifference of the contractor to saving. The more the building cost the more he made. The longer it took the more he made. Employees who worked up schemes for reducing costs were discharged or reprimanded. The owner was "milked" unmercifully and this is the tendency of the usual percentage contract method. One does not have to associate very much with the employees of large concerns specializing in the percentage method of contracting to learn that lavishness in expenditure is the rule, not the exception.

In all the different methods proposed for doing work by contract the idea foremost in the minds of contractors is to arrive at a method to insure a reasonable profit, which means the elimination of irresponsible bidders. The idea foremost in the minds of owners is to get the building constructed as nearly as possible for nothing and cut out quarreling over "extras." A modification of the "lump-sum" method was proposed by the writer in 1896, was revived in 1909 and is again presented in this paper for discussion by the readers of *The Building Age*. So far as he knows it is original.

A Suggested Method of Procedure

Let a careful estimate be made of the cost of the work; this estimate to be made by a man skilled in such work and to be handed to the owner in a sealed envelope to be opened when the bids are opened. Reject the highest bid and the lowest bid. Average the remaining bids. The maker of the bid nearest the average is to be the successful bidder, provided his bid does not run more than 15 per cent. above the careful estimate which estimate is supposed to be of the actual cost to the contractor without profit. The 15 per cent is assumed to allow the contractor a fair profit.

We are all familiar with the picture of the dazed-looking man sitting at a desk holding a letter informing him that he is the lowest bidder on a piece of work. Above the picture are the words, "What did I forget?" It is too true in a great many cases that the first thought of a man who receives a contract is that he must have made a mistake. This is due to the present unscientific and haphazard way of estimating on work in the United States. Estimators are not all paid what they should be paid, and it is seldom that enough time is given in which to take off quantities. Mistakes are common and a great many owners rely on the hurry to be to their advantage.

In Great Britain contractors are not permitted to take off quantities, this being done by regularly licensed

"Quantity Surveyors"—men well trained in this work and under bonds. A quantity surveyor takes off the quantities for each trade and tabulates them on sheets ruled according to a regulation form. The quantities are sold to contractors at a cost that is frequently much less than would ordinary estimators charge for doing the same thing. The accuracy of the quantities are guaranteed by the bond of the surveyor, so all the contractor has to do is to look over the plans and specifications and price the items. It eliminates all guesswork as to quantities and pits men against each other on the basis of ability to do work at a fair price. Real ability is thus developed and the irresponsible contractor is pretty well eliminated.

The Quantity Surveyor

A very strong movement has been started in the United States to inaugurate an American method for quantity surveying. The Quantity Surveyors' Association has been organized with G. Alexander Wright, of San Francisco, Cal., as president. Mr. Wright was for many years a quantity surveyor in England and for the past twenty-five years has been one of the leading architects of the Pacific Coast, being now president of the Technical Society of the Pacific Coast.

If the quantity surveying idea can be introduced into American practice, then the percentage system will approach the ideal set out by Mr. Birchler, but, as remarked before, the all-powerful "extra" item will still bother the owner until he is given to understand that with accurate quantities on which all contractors bid, the tendency will be toward unit-price bidding instead of lump-sum bidding. This unit-price method, of course, effectually fixes all extras, for the contractor bases his bid on a certain minimum amount of work, and the rest to be according to the unit price fixed. This permits the owner to do more or less work than contemplated at first, the unit price being increased in proportion to the amount of work omitted and maintained in the case of additional work being ordered.

Lumber Production in 1912

According to a preliminary statement of the output of lumber, laths and shingles in the United States in 1912, 1911 and 1910 just issued by Director of the Census William J. Harris, there was produced in 1912 by 29,648 active mills 39,158,414 M feet board measure; in 1911 there was produced by 28,105 active mills 37,003,207 M feet, and in 1910 there was produced by 31,934 active mills 40,014,282 M feet.

Of the reported total lumber production, soft woods contributed 30,526,416 M feet board measure in 1912, as against 28,902,388 M feet in 1911, and 31,160,856 M feet in 1910. More than nine-tenths of the present stand of yellow pine—the softwood which is drawn upon most heavily for lumber material—is in the yellow pine belt, which comprises the Atlantic and Gulf Coast States from Virginia to Texas, inclusive, together with Missouri, Arkansas and Oklahoma. Under the term yellow pine are included the several species—longleaf, shortleaf, loblolly, Cuban, etc. The reported cut from yellow pine timber in this territory during the year amounted to 14,470,617 M feet board measure, or about 98 per cent. of the total output from this species in the United States. Douglas fir, the species which ranked next to yellow pine among the conifers, or softwoods, supplied material for 5,175,123 M feet board measure. The production from both of these species was greater in 1912 than in the preceding year. White pine ranked third among the softwoods in 1912, though the cut from this wood was smaller than in the preceding year and has been declining steadily for several years past.

The reported cut of hardwood lumber in 1912 was

8,631,998 M feet board measure, as against 8,100,819 M feet in 1911, and 8,857,426 M feet in 1910. To this total oak, the leading hardwood species, contributed 3,318,952 M feet, or 38.4 per cent., and showed an increase over the output for the preceding year of 220,508 M feet, or 7.1 per cent. Maple, red gum, tulip poplar, chestnut, beech and birch followed oak in the order named.

The production of lath and shingles in 1912 did not differ materially from the output of these products during the preceding calendar year, although each was reported in slightly smaller quantities than in 1910.

Mammoth Girders Used in Building Construction

Every now and then in connection with some building enterprise in the larger cities of the country mammoth girders are used which are notable not only for their size but for their weight. Numerous examples of this kind have been cited in these columns, more particularly in connection with the new Municipal building in New York City, the Woolworth Building, and the new Consolidated Gas Company's Building. On Saturday, September 6, two girders, which are among the largest ever used in the construction of a commercial structure in New York City, were set in place in the new Lord & Taylor building on Fifth avenue, extending from Thirty-eighth to Thirty-ninth streets. Each girder weighed 40 tons and they were placed side by side on the Thirty-eighth street side of the building so as to form the entrance to the automobile ramp leading into the basement where all merchandise will be received and delivered. The girders, which had a span of 60 ft., are used to eliminate two columns and upon them instead of the foundation rests the supporting piers that carry the weight of the structure above the second floor at this point.

Higher Wages and Shorter Hours for Labor

Statistics just published by the Department of Labor at Washington, D. C., indicate that labor is now receiving more remuneration for fewer hours of toil than ever before. The figures are based on comparisons of union wage scale agreements, trade union reports and working compacts in central states throughout the United States from 1907 to 1912. The inquiry was an elaborate one and the result is the most comprehensive document of its kind ever issued by the Government.

It was prosecuted by segregating the trades under the general divisions of building trades, marble and stone trades, printing trades, baking trades, etc. The members of the latter were the largest gainers for their wages were increased 22 per cent. in the six years while their working day was shortened nearly one-fifth. Stonecutters received the lowest rate of increase and they with newspaper compositors were the lowest in the scale in the matter of reduced hours.

Colorado Marble for Lincoln Memorial

The white marble of which the \$2,000,000 Lincoln memorial temple is to be built on the banks of the Potomac in Washington is to come from the Sopris National Forest, Colorado. This is said to be the first great building in the east to be constructed of this stone, known to the building trades as Denver marble, though much of it has been used as an interior finish in public buildings. In the west a notable example of its use is found in the new Federal building at Denver.

The new construction rules relating to motion picture theaters in New York went into effect August 8.

DESIGN AND CONSTRUCTION OF GARDENER'S COTTAGE

A Frame Structure with Stucco Finish for the Main Story and Shingles Above—A Compact Arrangement—Some Interesting Details

THE cottage here shown is of balloon frame with an exterior of stucco for the first story and shingles for the second story. The stucco is applied to 26 gauge metal lath securely stapled to furring strips nailed to the sheathing boards. The general appearance of the completed building is shown in the half tone engraving presented upon this page.

It will be seen from an inspection of the plans that upon the main floor is a living room, a dining room and kitchen. The living room is reached directly from the porch, which has a brick floor laid in herringbone pattern.

The kitchen is equipped with range, sink, tubs and

1 x 6 in.; first and second floor beams, 2 x 8 in. placed 16 in. on centers; second story ceiling beams, 2 x 6 in.; rear porch sills, plates, beams and rafters, 2 x 6 in.; ceiling beams, 2 x 4 in.

The exterior frame work is covered with 1 x 6 in. tongued and grooved North Carolina pine sheathing, over which is placed a layer of black Neponset waterproofed building paper made by Bird & Son, 16 River Street, East Walpole, Mass. The side walls where shown on the elevations and in the photographic view are covered with 18-in. Washington red cedar shingles laid 5½ in. to the weather. The stucco covering the first story is of two coat work, the first coat being com-



Photographic View of Gardener's Cottage on the Estate of T. P. Fowler at Warwick, N. Y.—Architect and Builder, F. M. Horton of that Place

closet, and the stairs to the cellar lead down from a point near the kitchen door, which opens upon the porch.

The position of the bathroom on the second floor is directly over the kitchen, thus permitting of an economical installation of plumbing work.

According to the specifications of the architect, the foundations are of concrete composed of one part cement, two parts sand and four parts gravel, the concrete being poured wet. The foundation walls above grade are treated where exposed to view with a mixture consisting of one-part Edison's cement and one part sand. A wash is formed from the cellar window frames sloping out. The framing timber used is hemlock and chestnut of the following dimensions: Sills, 4 x 6 in.; girders, 6 x 8 in.; corner posts, 4 x 6 in.; studding, 2 x 4 in. laid 16 in. on centers; ribbon boards,

posed of one part cement, two parts medium sand, one part fine sand and one-half part lime mortar. The second coat, which was applied with a wooden float, was composed of one part Edison's cement, one part fine sand and two parts medium sand. Before this was thoroughly set it was given a rough cast effect with a broom. Metal corner beads are used at the corners.

The roofs are covered with Washington red cedar shingles laid on 1 x 2½ in. shingle lath, the exposure being 5½ in. to the weather.

The floor of the front porch is of common building brick laid upon a foundation of 18 in. of stone and gravel thoroughly tamped and settled with water. The brick are laid flat in herringbone style.

The cellar has a concrete floor 3 in. thick composed of one part cement, two parts sand and three parts

gravel, over which is a finishing coat 1 in. thick composed of one part cement and two parts sand.

The sash are of white pine $1\frac{3}{8}$ in. thick, glazed with first quality American sheet glass, double thick for the large lights and single thick for the small ones. Sliding sash are double hung with cast iron weights and cotton braided sash cord.

The blinds have white pine rolling slats and are hung with Clark's patent blind hinges.

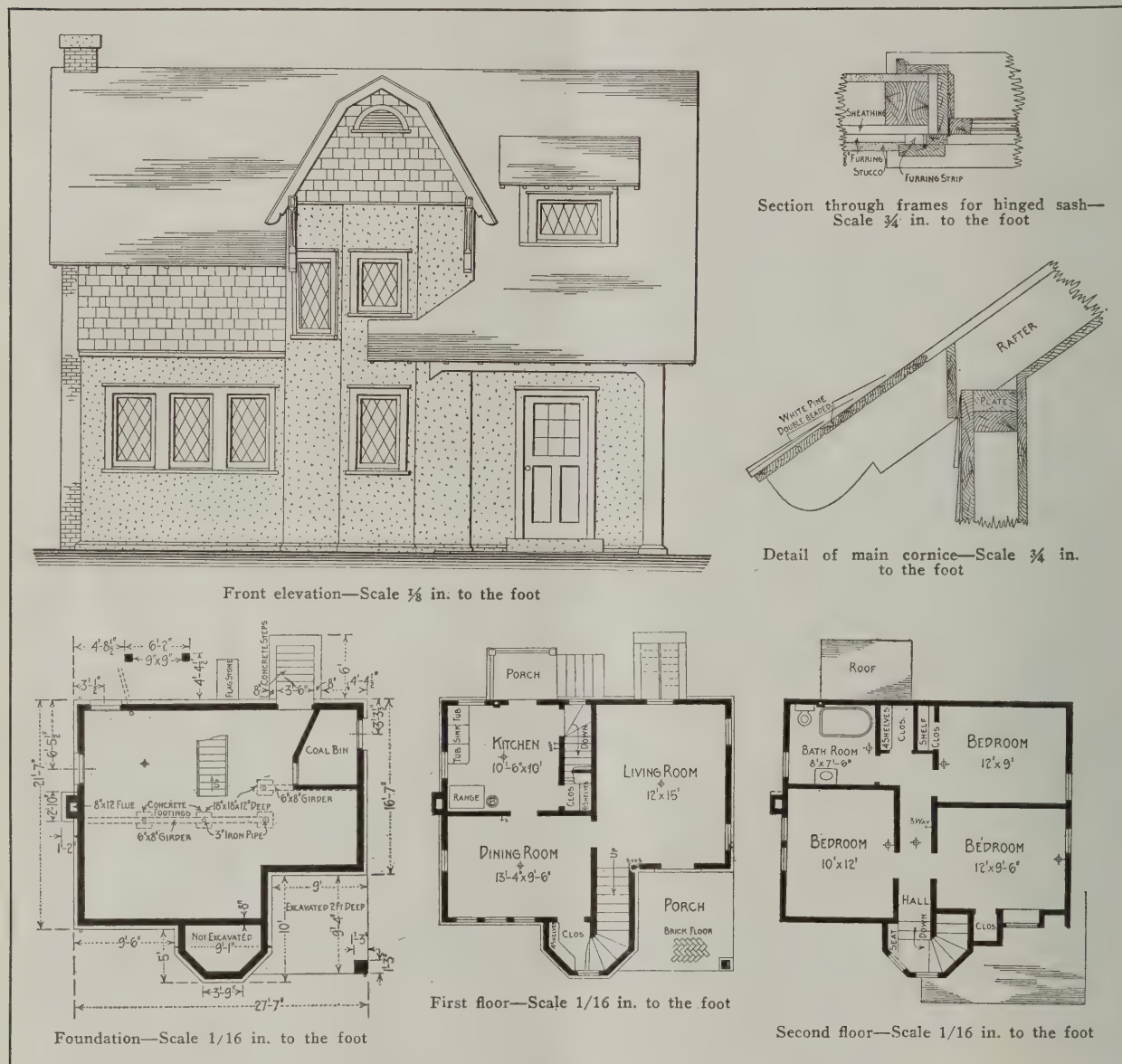
The front door is of white pine $1\frac{3}{4}$ in. thick. Interior doors are also of white pine and of the five cross panel variety.

Interior finish is of white pine, the side casings of

all the necessary water connections, also a "Perfect" range made by Richardson & Boynton Company, 31 West 31st street, New York City. The wash trays and sink are of soapstone. In the bath room is a 5 ft. enameled iron tub with 3 in. roll rim and nickel plated trimmings; a Siphon Jet closet, porcelain enameled bowl with oak seat and cover. The lavatory is porcelain enameled, 20 x 24 in. in size and has a 10 in. back.

The heating of the cottage is done by steam taken from the boiler in the stable a short distance away. All radiators and pipes in the rooms are silver bronzed and have nickel plated floor and ceiling collars.

All inside trim of the first and second floors have two



Design and Construction of a Gardener's Cottage at Warwick, N. Y.

doors and windows being $1\frac{3}{16} \times 3\frac{3}{4}$ in. with a $1\frac{1}{8} \times 1\frac{1}{4}$ in. back band around the outside. The windows have a $1\frac{1}{8}$ in. stool and a 4 in. apron.

The floors throughout the first and second stories are of $\frac{7}{8} \times 3\frac{1}{2}$ in. face North Carolina pine.

The main stairs have $1\frac{1}{8}$ in. stringers and treads and $\frac{7}{8}$ -in. risers, the stringers being housed.

A scuttle hole 2 ft. 6 in. square is provided in the ceiling of the second story hall and having a loose covering.

All hardware throughout the house is of anti-copper finish. All sliding windows have sash fasteners, single sash being hung with two $2\frac{1}{2}$ in. butts and provided with rod adjusters.

In the kitchen is a 30-gallon galvanized boiler having

coats of paint, and the same number of coats was applied to the outside woodwork.

The cottage is wired for electric lighting, the two-wire system being used.

Three dry wells are placed about 2 ft. from the building, the construction being of stone laid dry. To them runs from the leaders of the cottage a 4 in. tile drain pipe.

About 30 ft. from the building is a cesspool 6 ft. in diameter by 8 ft. in depth, the walls being of stone laid up dry and a top covered with a flag stone.

According to the contractor and builder the cost of the masonry work including foundation, chimney, concrete and brick floors, plastering and stucco was \$525; carpentry work including all lumber and mill work,

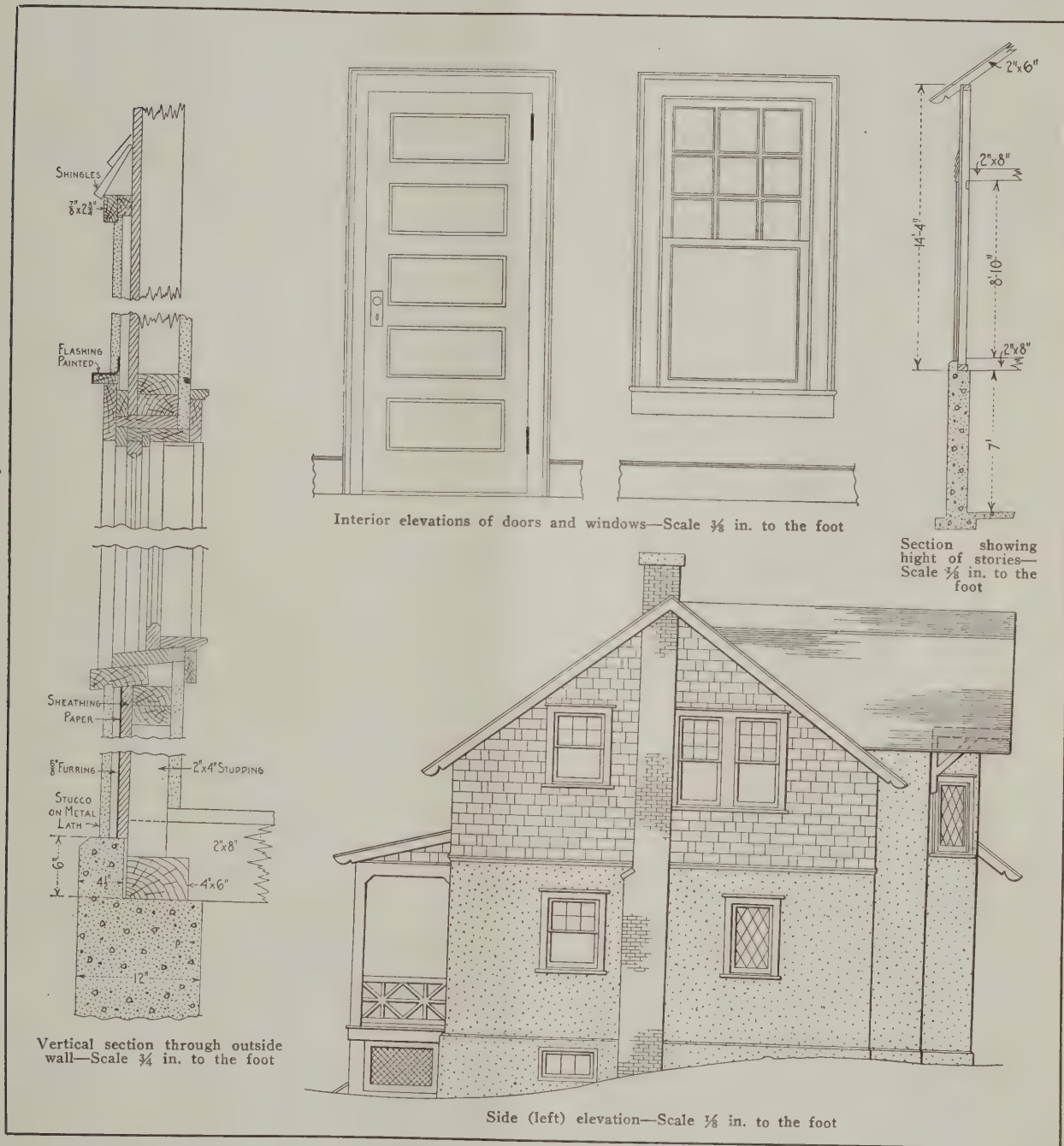
\$1,256; painting, \$75; electrical light wiring and fixtures, \$75; plumbing and heating, \$354; the total being \$2,285.

The gardener's cottage here described was erected on the estate of T. P. Fowler at Warwick, N. Y., in accordance with drawings and specifications made by F. M. Horton, Warwick, N. Y.

A Refrigerating Vault of somewhat unusual construction has recently been designed for use as a meat

New York's Evening School of Industrial Art.

The coming winter two new experiments will be tried in New York City in the teaching of applied art. The more important one will be in the form of an Evening High School of Industrial Art and will be conducted in Public School No. 27 in East Forty-first street near Second avenue. The second will be a series of semi-public classes in which art students may acquire craftsmanship in decorative work to be conducted under the joint direction of the Society of Mural



Miscellaneous Constructive Details of a Gardener's Cottage at Warwick, N. Y.

storage box in a manufacturing building on Second Avenue just north of 119th Street, New York City, the plans having been filed by Architect William G. Haug, 242 East 122nd Street. The vault will be built of waterproof material, the walls consisting of 12-in. brick and 12 x 24-in. concrete footings. Around the 12-in. wall there will be built 4 in. of waterproof bricks and the roof will be of waterproof material and concrete.

A Chicago man has brought out an awning that can be operated from within without raising the window.

Painters and the Society of Beaux Arts Architects.

The school of industrial art will open October 1 for four evenings each week and will continue until May 15, 1914. Among the subjects taught will be stained glass designing, including mosaic and lead-glass decoration; plastic designing, including original designs for terra cotta and stone work; woodwork designing, including the application of historic ornament to furniture and other interior decoration; wood carving, etc.

Newark, N. J., is erecting a theater to seat 1000 people.

BASIS OF ARCHITECTS' CLAIMS FOR SERVICES

When Contracts May Be Terminated—Owner's Liability for Breach—Architect's Right to Lien

By A. L. H. STREET



ARCHITECTS generally will be interested in recent decisions of the Washington Supreme Court in the case of Gould vs. McCormick, reported in full at page 676, volume 134, Pacific Reporter. The rules of law announced by the court, summarized, are as follows: When a contract employing an architect requires him to superintendent the erection of a building, seeing that the plans and specifications are followed and that the best materials and workmanship are used, and provides that he shall superintend the construction to the

"entire satisfaction" of the owner, the latter is not entitled to discharge the architect because of dissatisfaction, but only under *good cause for dissatisfaction*.

In reaching this conclusion the court governed itself by the general principle, relating to the interpretation of contracts, that when the terms of an agreement are doubtful whether they give the right to one of the parties to terminate it arbitrarily or only for good cause, the contract will be construed as permitting a termination for good cause only.

Measure of Damages Recoverable

The second point decided is that the measure of damages recoverable by an architect who is wrongfully prevented by the owner from completing a contract for the superintendence of construction is the difference between the amount agreed to be paid him for his services, and what it would have cost him to have executed his part of the agreement.

The third rule announced by the Washington court is that, although an architect has a lien on a building for services rendered by him in its construction only when a lien is expressly given by statute, that a statute providing that every person performing labor upon the construction, alteration or repair of a building has a lien upon the same, is broad enough to give architects a lien for their services in preparing plans and specifications, and in superintending the erection.

There being such a statute in force in Washington, plaintiffs were awarded the lien claimed by them. The Supreme Court said in part: "The courts of many of the states have been called upon to construe statutes containing substantially the same language, for the purpose of determining whether or not the right of lien existed for plans and specifications and superintendence of the architect. While the decisions upon this subject are by no means harmonious, the great weight of authority, as well as the better reason, appears to support the view that the lien exists where the language of the statute is general. It will be noted that the language of the statute above quoted is general and comprehensive in its terms. Had the legislature intended it not to be sufficiently broad to include the labor of the architect in preparing plans and specifications according to which the building was constructed, and in superintending the construction thereof, it would, doubtless, have made use of more restrictive terms."

Here the court quotes from a text-book on Mechanics' Liens: "The labor and skill of an architect

and superintendent of work upon a building are properly a part of the expense of erecting a building, and not unfrequently an indispensable and highly valuable part. As an item of such expense they enter into and help to form the value of the building, and there is no reason in the nature of things why the person who performs such labor and furnishes skill should not receive the same protection as the carpenter or mason."

The Washington court cites decisions of the Supreme Courts of Iowa, Minnesota, Nebraska, Alabama, New Jersey, New York and Pennsylvania to sustain the rule announced, and notes that court opinions which take an opposite view were based on more restricted lien statutes. The Alabama statute gives a lien for "work or labor upon a building or improvement on land," and the Minnesota statute on which the cited Minnesota case was based gave a right of lien to "whoever performs labor or furnishes material in constructing, altering or repairing a building." As above indicated the courts of these states have held that these statutes are broad enough to give an architect a lien for services in preparing plans and specifications for, or in superintending the construction of, a building.

Pittsburgh's Differences of Builders Settled

Disputes between The Builders' Exchange and the Builders' Trades Council at Pittsburgh, which have caused much trouble for both sides, have been satisfactorily settled. It was agreed by representatives from each organization that all differences shall be settled by a permanent board of arbitrators to be selected by both sides. This will prevent any future cessation of work while differences between the builders and the workmen are being adjusted.

The Builders' Exchange recognizes the unions and agrees to pay hod-carriers and mixers 40 cents an hour, and that a day's work shall constitute 8½ hours, provided the workmen report half an hour early so as to have brick and mortar ready for the bricklayers when they arrive. Laborers are to receive 25 cents an hour and nine hours shall constitute a day's work.

This agreement is satisfactory to all concerned, and the workmen and the builders are pleased with the plan to arbitrate their differences.

It may be interesting to American readers to know that there are no wooden structures in the city of Cologne, and that while buildings 400 to 600 years old are not wholly fireproof, they are of slow-burning construction. All buildings now erected, however, are of brick, stone or cement and made fireproof. Wooden stairways are not permitted in any except single residences of two stories. All others must be of iron or cement. It is stated that there has not been a dwelling house burned down in Cologne for many years, fires in most instances being confined to one room.

A building operation involving the erection of 68 two-family brick and stone dwellings to cost \$250,000 has been commenced on Jefferson Avenue and Hancock Street, Brooklyn, by James A. Canfield.

A FEW CURES FOR DEFECTIVE CHIMNEY FLUES

Examples of Some Trouble-Making Chimneys and Chimney Tops with a Description of a Remedy and a Successful Top



NE of the principal sources of trouble in connection with chimneys often occurs out of the differences of opinions as to how a perfect flue should be constructed. The architect will often cramp a flue in order that the outline may not show on the inside walls, to break his idea of the wall line, or he will place offsets in it in order that a window may show at a certain place on

the perspective, or that the top of a chimney may show at a certain place on the roof line. This may seem to be a strong indictment of the architects, says C. T. Soden in a recent issue of the *Metal Worker*, but it is no fancy picture. I have seen flues built as crooked as a dog's hind leg and for no other reason than those quoted above.

Another factor for misfortune is found in the bricklayer, and it is an exasperating fact that no two of them agree as to the correct lines in a flue and none

fact that in it is found the chief origin of many destructive fires.

What the craft thinks of the terra cotta flue lining as a rule has not been made clear, but if it held to the opinion that all difficulty is obviated by its use then I am of the opinion that the craft is standing on unsafe ground. My dear reader, have you ever stood on the scaffold and seen the average bricklayer place this kind of flue lining? I have. I have seen the most sloppy, slipshod work imaginable done in this line. I have seen the tile placed without mortar between its joints, have seen joints of tiling placed with large pieces broken out, have seen where there was a continuous air space between the lining and the brick almost the entire height of the chimney. I have seen so-called terra cotta flue lined chimneys leak at first use as badly as an old plastered flue, for the reason

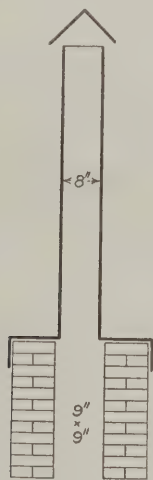


Fig. 1—Faulty Top

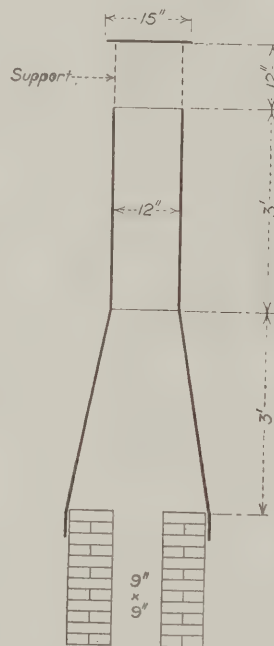


Fig. 2—Successful Top

A Few Cures for Defective Chimney Flues—Showing a Faulty and a Successful Top

of these gentlemen will be found open to conviction on these points. Each is correct, and that is the end of it.

In general practice there are three methods of lining flues, as follows: Plaster, terra cotta and struck joints. The first two are the source of all flue trouble, when trouble exists only in construction and not with outside influences such as high buildings, trees in close proximity to the flue, etc.

A plastered flue may be all right for a time, but eventually the elements cause the lining to scale off and in so doing pull the mortar from between the brick joints and cause the flue to take cold air from the outside, sometimes throughout its entire height. I will go farther; I doubt very much if a plastered flue ten years old can be found that does not leak more or less on its outside surface. I have repeatedly had to use ladders and scaffolding in order to stop these leaks. This style of lining should be condemned by all authorities, not only for its defects, but also for the

that there was no effort made to plaster brick joints inside. This condition, together with the defective lining, opens up the flue to all outside influences.

There is no doubt whatever that if this style of lining were placed honestly it would make a good and safe flue, but it is so susceptible to dishonest work that it is often worse than the plastered flue and is just as prolific of fires.

One other grave fault exists in the use of terra cotta lining; it is the dishonest method of rating it by manufacturers and architects. The former satisfies its capacity, the latter follows in his footsteps. Have you ever seen an instance where the architect specified his terra cotta lined flue correctly? No; I have not. For example, a 9 x 13 in. terra cotta lined flue is specified. Does it measure up to specifications? Never. All of this lining is rated by the manufacturer at outside measurements. For example, a 9 x 13 in. lining measures only 7½ x 11½ in.

I said this specification was dishonest; let us see why.

The specification calls for an area of 95 sq. in., but in the $7\frac{1}{2} \times 11\frac{1}{2}$ in. lining there is only 70.88 sq. in. available; a difference of 24 sq. in.; a loss of flue power of 25 per cent. Again we see specified by the architect that all flues at floor intersections must be lined with terra cotta. Comment on this specification is wasted time, for the dullest intellect can readily understand that a flue to be a success must have a smooth, continuous lining its full length. The danger from fire is, by this style of work, augmented instead of being diminished.

This brings us to the "struck" joint flue lining. Here we have a flue that will be doing good work after all other styles have gone into ruin. If this flue is built with cement mortar there is absolutely no danger from fire and you may be assured it will not need repair in an ordinary life time.

Now we come to a condition that often puzzles the oldest of the craft. A flue may be perfect in every detail and yet its usefulness may be curtailed by outside influences such as tall buildings, trees, etc., which cause down currents in a flue to such extent as to shut off the draft. A number of devices has been used to correct this trouble; some a success but costly to place, such as cowls placed on pivots, spider shaped con-

of pipes under a cone cap in which there is no allowance for expansion or layers of free carbon that will form on the inside of this pipe in a week's use. In so short time an 8-in. pipe will not measure up to 7 in. in diameter and continued use will close it off entirely.

This cone is placed on top of the pipe for the ostensible purpose of preventing down currents and to keep out the rain. It is a sure thing as to the latter purpose and a howling success in preventing the exit of upward currents in the flue, as the illustration will demonstrate without question. The height of the standards usually used to fasten the cone to the top of the pipe on this style is 3 to 4 in. When it is understood that the windward side of the opening provides all of the available outlet, when the wind blows through on the horizontal line, it is easy to see that this outlet in many cases is reduced 50 per cent, and over. The standards should have a height equal to the diameter of the pipe

A Method of Constructing Chimney Tops

A method of constructing chimney tops that I have used many years with never a failure, either by down current or filling by soot, is presented in Fig. 2 of the illustrations. A study of this construction speaks for itself. The lead lines at the entrance to this pipe at the top of the brick flue are perfect. The flat cover on the top of this pipe is placed on standards equal to the diameter of the pipe. The diameter of the cap is 2 to 4 in. wider than the diameter of the pipe, and more is better. There is not a single point of obstruction in its whole makeup. It matters not from which point of the compass the wind blows there is always a full escape provided on the windward for the exit of the up current.

The dropping of a falling current cannot enter on account of the flat cap which is used to offset the conditions presented in Fig. 3 of the illustrations that existed in the last job I put up before retiring from the business. These conditions were about the rawest I ever ran up against during my whole experience in the business. The irregular-shaped building shown in the center of the diagram fronting on one street is one story with about 10-ft. ceiling. No occupant ever succeeded in heating this room after the adjoining buildings were built. I was called in to inspect the situation.

During windy weather the fire was not built on account of smoke issuing from the stove into the room. I had the occupant build a 9 x 9-in. flue 15 ft. high at the point located on the plan. On this I placed the device as shown in the second illustration. This job has been working now six winters with not a single break and most of the time with the stove door open.

It is not necessary to go into an explanation why this device is a success. Study its lead lines from bottom to top. These lines conform to all laws that govern the flow of heated currents of gases, etc. No air current short of a cyclone, or hurricane, can enter at the top. Have you considered the velocity of a rising current in a good unobstructed flue? No! Well then here is an opportunity to make an interesting experiment. Find the velocity of an up current per second in a perfect flue under a temperature of 150 deg. From this result find the number of feet per hour and reduce to miles. I think that a majority will be astonished at the velocity of the little hurricane we have in a perfect flue and recognize at the same time the impossibility of down currents at any time.

In closing I beg leave to say that the foregoing has been written with a desire to assist the operator in disposing of this the most trying of all adverse conditions he will meet. Years ago I made a study of faulty flues and conditions causing complaint. I have never failed in a single instance to correct the most difficult situations I have encountered and I hope that this contribution may be of benefit to the craft.

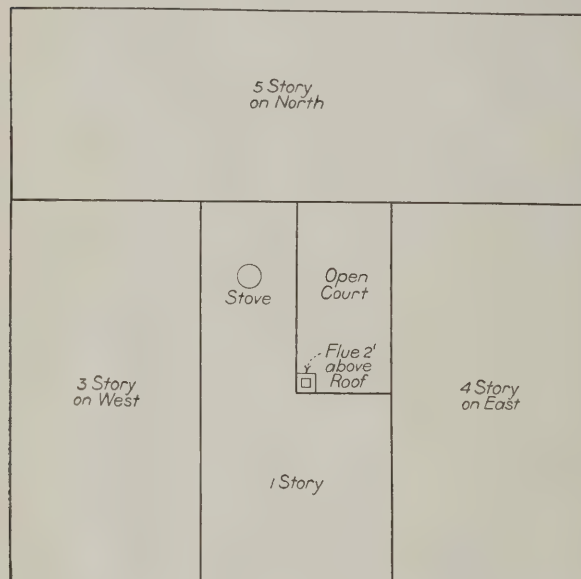


Fig. 3—A Few Cures for Defective Chimney Flues—Chimney Surrounded by Difficulties

trivances which in a manner allow air currents to pass through them on a horizontal line and out on the windward side. In some cases these do correct, but not always. Another feature is their capacity for soot.

Often in his effort to correct trouble in a chimney the operator resorts to the device as shown in Fig. 1 of the accompanying illustrations. Here he aggravates the trouble, rather than decreases it. He makes a flat cap with an 8-in. collar in the center and a drop flange to fit over the capping of the brick chimney. To this he attaches a 7 or 8-in. pipe often 15 to 20 ft. high. Sometimes this latter condition prevails where the pipe is run up the outside wall of an adjoining building. On the top of this pipe he places a cone secured to the top of the pipe by standards 3 or 4 in. in height. By this arrangement he reduces the outlet at least 50 per cent. of the capacity of the pipe. The upward current in the brick flue is barred at the entrance to this pipe and again at its exit at the top of the pipe.

It is inconceivable why modern mechanics still cling to this impossible freak of the past ages. The area of a 9 x 9-in. flue is 81 sq. in., while the area of an 8-in. pipe is 50 sq. in., a loss of flue area of $37\frac{1}{2}$ per cent. It also illustrates the manner of obstruction at the top

SOME ADVANTAGES OF BUILT-IN FURNITURE

How One Apartment, 14 by 15 ft. in Plan, May Be Used in Turn As a Dining-Room, a Living-Room and as Bed-Room

CERTAIN social circles here and elsewhere that are interested in welfare work are encouraging a movement to provide more desirable living accommodations for business women. Several experiments have been made along this line both in Manhattan and Brooklyn, but those who have studied the subject in other cities believe that our estates managers have not



When Used as a Living-Room

yet caught the right idea or produced an apartment that can be accepted as an entirely satisfactory model.

Experiments so far locally made, however, have proved the economic soundness of the proposition, and have provided, to a degree, hotel comforts at boarding house rates, but have not exemplified the architectural possibilities. They have not removed the necessity for having furniture of one's own, nor stepped very far away from the old-style boarding-house arrangements.

Most cities which have built homes for professional and business women have provided considerable built-in furniture. Some are going to the extreme of building "Pullman flats," where one can pull a bed out of the wall, or uncover a kitchen outfit, says a recent issue of *Record and Guide*. The writer has before him progress photographs of a building called the "Merrill Mansions," which is under construction at the present time at Providence, R. I. It is a three-story and basement building, of fireproof material for the most part, and contains thirty apartments, but the building is to be added to and will ultimately have 108 apartments.

The distinguishing characteristic of each apartment is in the furniture. One room, with dimensions of 14 x 15 ft., is used in turn as a sleeping room, dining room or library. It is completely furnished and the occupants have nothing to do except to provide food and clothing. In the basement is a restaurant with service kitchen and mechanical apparatus for washing dishes for each of the tenants, which does away with the drudgery of housekeeping. Each apartment has a bath room, a kitchenette with gas range and an extra closet for storing personal belongings.

Reversible and convertible furniture which swings on strong pivots set perpendicularly into the walls is the secret of the "Three-In-One." Simply by releasing a lock and swinging a section of the wall one may convert the apartment from a beautiful dining room

into a cozy living room or library. Another turn of another section will add the charm of a music room, with piano and music cases, to the library.

Yet another swinging of the wall sections will conceal all traces of dining room, living room, music room and library, and convert the apartment into a bedroom.

Sweeping has no place in the lexicon of the "three-in-one" apartment. All the work usually classified as sweeping is done by vacuum cleaners, operated by servants employed by the company.

Of course in order to have built-in furniture of this variety, the walls and partitions of the building must be expressly designed to accommodate it.

Where buildings have already been erected and equipped, the apartments are rented at rates varying from \$25 to \$35 per month for each suite.

When buildings devoted exclusively to the new one-room suite have been built, the owning and operating company will furnish everything necessary for house-keeping, if tenants so desire.

The tenant has the choice of the following: A combination writing-desk and bookcase when used as a living room, and out of the way when used as a bedroom.

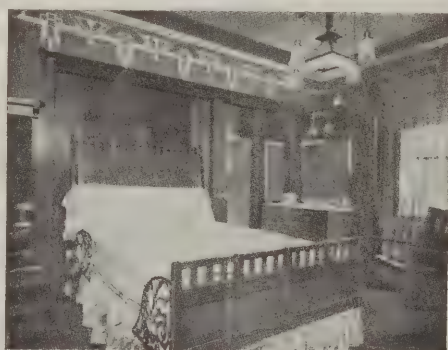
A sideboard in the room when used as a dining room, and out of the room when used as a bedroom. A lady's work table in the room when a living room, and out when a dining room.

A dresser in the room when a bedroom, and out of room when a living or dining room. A full length mirror in the room when used as a dining or living room. A dressing room in the clothes closet sufficiently large for use. A telephone in each apartment.

A wall vault for jewelry, silver and valuables. A full set of fumed oak rockers and chairs. A wardrobe couch. A rug of Oriental design to cover the polished oak floor. A dining table when the room is used as a dining room, but out



As a Dining-Room



Or When Arranged as a Bedroom

Some Advantages of Built-In Furniture—Showing How Three Apartments May Be Combined in One

of the room when it is used as a living room and bedroom. A set of genuine Haviland china of dainty pattern. A full set of silver. A dozen each of Irish linen napkins, towels, with tablecloths. A dining room radiator in each apartment to keep dishes and food hot.

A bed with double-deck springs in the room when used as a bedroom and out when a living or dining room. A fine curled cotton mattress, sheets, pillow cases, blankets. An electric curling iron. A gas or electric stove, on which dainty dishes may be cooked. A caloric cooker. A full set of aluminum cooking utensils. A refrigerator cooled from the ice machine in the basement. An electric meat chopper, coffee grinder, bread and cake mixer, egg beater, cream whipper and potato peeler. An electric flat iron.

A kitchen sink, nicer and more suitable than the ordinary. A wash tray (tub) in which to wash out special pieces or do a full washing. A clothes dryer, especially designed, heated by gas or electricity. A wire basket in which all dirty dishes are placed and sent on dumbwaiter to the main kitchen, where the basket with the dishes is passed through caldrons filled with boiling water, rinsed in a spray of clean hot water, sterilized in a jet of steam, returned hot and dry to the pantry in two minutes without being touched by a hand. A garbage pail bracketed on the back of a door.

The coziness of such an apartment has a particular charm for the city bachelor girl who from force of circumstances or a desire to adhere to the conventionalities of her social position rather than ape the Bohemian girl wants the privacy as well as the social life without having to make a very apparent boudoir serve as a reception room or refectory. The Merrill idea fills this demand, which in this day of feminine independence bids fair to be an increasing one.

The type of building which is being completed by the Merrill Corporation in Providence and those which it has erected in other cities, eliminate wooden forms for concrete. This is the system of the Suspension Steel Concrete Co., of Chicago. The stairs are of steel.

The Providence building here described is not presented as an example suitable in all respects for the emulation of metropolitan managers of estates but rather as an illustration of the tendencies of the movement in other places and the possibilities of the idea.

Foundations of Exhibit Palaces at Panama-Pacific International Exposition

In the early history of San Francisco, the area to be occupied by the main exhibit palaces of the Panama-Pacific International Exposition in 1915 was a tide flat, some portions of which had been dredged to accommodate shipping. In recent years, however, private interests had built a sea wall across the north of the basin in an easterly and westerly direction and filled a portion of the area inclosed. This work was not completed and it remained for the exposition company to fill the inland basin by means of suction dredgers.

After the exposition's fill was completed, a number of tests were conducted to determine the supporting power of the soil at the depth of what probably would be the spread footing bottom. The result of these tests indicated that the supporting power of the dredger sand was only about 400 pounds per square foot, which prohibited the use of this type of footing.

Pile tests were made also, and it was found that the fill, in settling, gripped the piles in such a manner as to act as a load upon them. This caused the piles to penetrate into the original bottom and the conclusion was reached that unless the piles were sufficiently long they would settle with, and more rapidly than, the fill when the superimposed load would be brought upon them. Therefore, after a careful investigation, the engineers were forced to the conclusion that it would be inadvisable to carry any given load by skin friction alone. The general character of the soil under

the dredger fill was clay, mixed with blue mud and water, underlaid with a layer of green sand and clay, and, finally, hardpan, the hardpan being located all the way from 30 to 120 feet below the surface. In view of the great number of piles required, economy of length was an important factor, and it was decided finally to drive all the piles into the layer of green sand and clay overlying the hardpan, to a 1-inch penetration at the last blow.

In general, the character of the soil underlying the sites not covered with the dredger fill was yellow beach sand, soft clay and sand, hard green sand and clay, and, finally, yellow hardpan, except in areas that had been filled prior to the commencement of exposition activities. It was decided to use, in general, piles for the support of all buildings, walls and special loads in these areas; also in the recently filled area.

The reason for this was threefold: (1) Uniformity of construction; (2) greater safety in case of earthquake, as portions of the site were originally submerged, and past experience in San Francisco indicated that structures were not affected when they were supported on spread or raft footings, and (3) in giving a value of 3,000 pounds to the square foot to the sand it was found that a spread would cost as much if not more than a pile footing.

The actual length of pile driven through the site will vary from 60 to 75 feet, and in all cases an assumed load of 20 tons was taken as the value of one pile. The oddity of this constant unit, inasmuch as the value of the pile usually depends upon skin friction and length, is explained by the fact that, in the case in point, tests were conducted that confirmed the selection of the amount named.

An Office Building of Concrete Blocks

A rather unique office building has lately been erected at Gary, Ind., wherein the foundations are of plain concrete to a point 4 ft. above the ground and stained gray, above which the walls are of 8-in. hollow blocks with a flat vertical tooled face, which, although obtained by the use of a face plate in the machine, is rough and gives an excellent appearance. The roof is a solid concrete slab $6\frac{3}{4}$ in. thick with a cinder and tar and gravel covering. The roof slab is supported on central columns as well as on the block walls.

The office building is one story high and consists of a main structure 44 x 70 ft. in plan and a wing 31 x 27 ft., having its floor at the ground level for use as a garage. The plans of the building are of reinforced concrete with cement finish. The contract for the structure was executed by the Gary Tycrete Company, of Gary, Ind.

Finishing Oak in Antique Green

An authority on the subject gives the following directions for finishing work so as to give it an antique green effect:

Beat up one pound raw Italian sienna of yellowish tone, that is ground in oil, adding four ounces of burnt umber in oil and from two to three ounces medium chrome green in one pint of liquid dryer. Then add three pints spirits of turpentine and enough raw linseed oil to make one gallon of stain. Apply this to the dressed lumber after sandpapering and dusting and allow to dry. Use antique oak paste filler, or, if you do not care to purchase this, color some natural paste wood filler with burnt umber and a little chrome green, following the usual method of using paste fillers. Finish as may be desired with rubbing varnish and finally with finishing varnish.

CURRENT NEWS OF THE BUILDERS' EXCHANGES

What Some of the Organizations Have Been Doing to Increase Membership
—A New Secretary—Results of the "Open Shop"

Detroit Builders Visit Buffalo

ABOUT 30 members of the Builders and Traders' Exchange of Detroit, Mich., visited Buffalo, September 14 and 15, many of the members being accompanied by their wives. The party left Detroit Friday evening, spending Saturday at Buffalo, Sunday at Niagara Falls, and returning to Detroit Monday morning. While in Buffalo they were the guests of the Builders' Association Exchange, and their pleasure and comfort was looked after by the genial secretary of that organization, James M. Carter, who by reason of his long service in connection with both the local and state associations is an adept in this line. Among others in the party were George H. Clippert and Charles A. Bowen, president and secretary, respectively, of the Detroit Exchange; L. B. Wright of Berry Bros.; A. Berschbach of the American Roofing Company; J. D. Candler of the J. D. Candler Roofing Company, and J. B. Mansfield of J. E. Bolles Wire & Iron Works.

The latest issue of the official organ of the Builders and Traders' Exchange is replete with matter of interest to the members of that body as well as to those outside the membership associated with the building and allied industries. Prominent among the matter is a reprint of legal decisions by A. L. H. Street, taken from the September issue of *The Building Age*. There are items relating to the outing of the Master Mason Contractors' Association; the stag outing of the Builders and Traders' Exchange at Westwood, just beyond Dearborn; the outing of the Detroit Association of Master Plumbers, which joined with the association of Toledo in a huge picnic at Sugar Island, and the outing of the Master Painters and Decorators' Association at Mackinac Island. There are several pages of personal items, followed by a summary of some of the more important features of the local builders' exchange.

Portland Exchange Elects Officers

The members of the Builders' Exchange at Portland, Ore., recently held the annual meeting, at which the following officers were elected:

President.....John S. Seed
Vice-president.....A. W. Kutsche
Treasurer.....F. X. Le Doux
Secretary.....E. J. Findley
Financial secretary.....O. G. Hughson

Since its inception the Exchange has enjoyed an excellent growth, but a strong campaign is now under way to still further add to the membership. Architects are eligible to membership as associates, but not as active members.

The Exchange has a complete directory of its members and maintains an excellent Information Bureau for the convenience of persons having business with those connected with the building trades.

Master Builders' Association of Boston

Speaking of the membership of the Master Builders' Association of Boston, Secretary W. H. Sayward in his Monthly Letter states that the list totals 282 and that the average for the past eleven years preceding 1912, when systematic solicitation for membership began, was 244. While the increase is very satisfactory Secretary Sayward points out that it is far below the number that should be recorded. With cities of the size of Cleveland enrolling over 400 members in its Builders' Exchange, he states that it is not excessive to expect the Master Builders' Association to have a membership of double that number, for the territory of Greater Boston includes "at least three times the population of similar territory in and around Cleveland."

Mention is made in the Letter in question of the success of one of the members in the securing of what is probably the largest contract for electrical work ever undertaken in New England, it being a contract for the electrical outfit of the Commonwealth Dock, now being constructed under the control of the Directors of the Board of Boston. Another member of the Association

is engaged in putting in the electrical work for the American College at Constantinople, Turkey, a contract even larger than that for the Commonwealth Dock.

New Secretary of the Grand Rapids Builders' Exchange

Members of the fraternity will be interested in learning that on September 15 A. H. Shank succeeded W. G. Martin as secretary of the Builders and Traders' Exchange at Grand Rapids, Mich., Mr. Martin resigning to engage in a different line in Cleveland, Ohio. His work in connection with the Grand Rapids Exchange was of a most gratifying nature and it goes without saying that his departure for other fields of activity is a source of much regret on the part of the members of the organization and to his friends and acquaintances outside that body.

Monthly Meeting of Washington Builders' Exchange

Heretofore the Builders and Manufacturers' Exchange of Washington, D. C., has held only two membership meetings a year, the Board of Directors alone holding a meeting every month. Beginning in September there was inaugurated monthly membership meetings and a campaign was set on foot to increase the membership. The meetings are held the second Monday of each month.

Since June the Exchange has added nearly 50 members to its rolls, and inspired by the increase during the summer months the officials of the Exchange expressed the hope that 100 more may be added during the winter.

At the meeting held the middle of September, which was the first since the summer recess was taken and which was presided over by Charles A. Langley, various topics came up which were to be carefully considered, among them being the district building regulations, the local laws pertaining to liens and numerous other matters of importance to the building trades.

Master Builders' Association of Iowa

There were about 150 contractors and their friends who participated in the first annual "Outing" of the Master Builders' Association of the State of Iowa which was held September 14 and consisted of a steamboat trip from Davenport to Keokuk, Iowa. The day of the 14th was spent in getting better acquainted and for a good time socially, and it may be remarked at this point that socially the outing was a success in every way, and it is the confident expectation of the management to hold these annual outings in the future.

The 15th of September was devoted entirely to matters of importance pertaining to the relations which should exist between the contractor, owner and architect. It was the sense of the meeting to bring out such points as would likely be of interest to all concerned and to have specifications so written that the blame for any errors would rest where it belongs and not entirely upon the shoulders of the contractor as at the present time.

It seemed to be the sense of the meeting also that an architect should be able to estimate his buildings so that they would come within the appropriation made and not be obliged to resort to alterations to complete the work within the prescribed limits. A committee was appointed to meet a similar committee from the architects.

Open Shop for Birmingham Builders

The General Building Contractors' Association of Birmingham, Ala., has "decided after about six months' trial that the 'open shop' is the only condition under which Birmingham can continue to thrive." It is stated that their work has been permitted to go on uninterrupted by the business agents and the members of the Association have been able to comply with their contracts with owners in completing the jobs on time. They point out that although they have been paying the scale to all men in their employ and have not increased the number of hours per day, the cost of labor in construction has decreased about 20 per cent. /

A BRIEF REVIEW OF THE BUILDING SITUATION

Figures Showing Building Activities in Leading Centers Based on the Value of Permits Issued in August, 1913, and August, 1912



SIGNS of returning prosperity are quite evident in the report of the number and value of building improvements for which permits were issued in the principal cities of the United States during the month of September, 1913. Most of the leading cities of the country show a gain over the corresponding figures of last year.

Of the cities of the northeastern section of the country, New York records a decline of 29 per cent. over the figures of September, 1912. Even with this noticeable decrease, the figures for the city are better than those of August, 1913, and indications point to a resumption of building activity in

the city. The principal item on the building permit list is that of the \$3,500,000 American Bank Note building.

Philadelphia shows an increase of 56 per cent, while Boston has an increase of 17 per cent, and Pittsburgh gains 6 per cent over the figures of last year. Syracuse has an increase of 268 per cent; Utica, 373 per cent; Troy, 1386 per cent. Rochester loses 13 per cent; Buffalo, 2 per cent and Washington loses 12 per cent over the figures of last year. Baltimore makes a much more favorable report with an increase of 20 per cent, while Newark, N. J., loses by the same percentage. New Bedford, Mass., comes into prominence with an increase of 265 per cent. The other smaller cities of New England show losses. Worcester loses 39 per cent; Hartford, 15; New Haven, 25, and Springfield, 77. An exception is to be noted in the case of Portland, Maine, which records an increase of 247 per cent. The smaller cities of New Jersey and Pennsylvania suffered decreases with few exceptions.

NORTHEASTERN STATES

	1913		1912	
	No. of Buildings	Estimated Cost	No. of Buildings	Estimated Cost
New York	1378	\$8,726,246	1203	\$12,316,713
Boston and vicinity...	456	5,237,000	356	4,476,000
Philadelphia	1302	4,363,955	1010	2,798,700
Syracuse	292	1,441,613	124	390,820
Pittsburgh	238	1,434,790	308	1,343,749
Utica, N. Y.	343	1,359,253	77	287,074
Troy	89	920,600	45	63,280
Rochester	279	834,226	312	969,936
Buffalo	326	821,000	307	838,000
Baltimore	377	808,237	206	669,760
Washington, D. C.	359	740,886	453	841,127
Newark	208	561,526	219	708,625
New Bedford, Mass.	115	501,000	65	137,000
Worcester, Mass.	142	404,619	143	666,902
Hartford	103	369,421	101	437,530
New Haven	94	243,880	84	325,765
Springfield, Mass.	112	232,025	138	1,017,090
Elizabeth, N. J.	52	182,000	32	192,890
Portland, Me.	32	179,000	..	51,590
Trenton	79	144,917	73	360,885
Wilkes-Barre	53	133,053	53	175,298
Harrisburg	37	83,800	35	101,050
Holyoke, Mass.	23	79,825	14	45,990
Altoona, Pa.	74	74,551	49	39,129
Scranton, Pa.	53	71,420	72	152,110
Reading, Pa.	27	69,025	55	122,825
Paterson, N. J.	49	54,215	66	126,119
Passaic, N. J.	38	51,970	27	85,890
Hoboken	16	25,665	18	15,154

Building conditions in the north central portion of the country are unquestionably on the upgrade, for with the single exception of Indianapolis, the larger cities of this section all show a healthy increase over the figures of 1912. Chicago, Detroit and Milwaukee all report an increase of 9 per cent over the figures of the corresponding months of last year. The most notable gains are those of Grand Rapids and Duluth, which show 406 and 455 per cent gain, respectively. Toledo makes a good record with 99 per cent increase and St. Paul of 89 per cent increase, while Cincinnati gains 24, Minneapolis 19 and Cleveland 41 per cent. Indianapolis loses 32 per cent, Columbus, Ohio, 7, and Omaha, Neb., 13. Akron, Ohio, gains 17 per cent and Evansville, Ind., 16 per cent, while losses are recorded in the case of Fort Wayne, Youngstown, Cedar Rapids, Iowa, and Peoria, Ill. Of the cities which have been troubled with labor disputes, the report comes that strikes have been settled in many cases, while in others amicable settlements are confidently expected within a short time.

NORTH CENTRAL STATES

	1913		1912	
	No. of Buildings	Estimated Cost	No. of Buildings	Estimated Cost
Chicago	930	\$7,858,920	969	\$7,201,900
Detroit	856	2,056,855	882	1,884,800
Cleveland	1065	1,949,545	763	1,379,315
Grand Rapids	150	1,573,350	118	264,130
Minneapolis	608	1,449,650	530	1,211,075
St. Paul	297	910,908	301	497,646
Milwaukee	333	874,509	379	803,889
Cincinnati	995	869,376	928	699,340
Indianapolis	551	675,504	447	1,000,540
Toledo	222	672,489	183	336,605
Duluth	150	473,897	88	85,408
Columbus, O.	237	473,195	236	513,025
Omaha	97	414,580	115	476,050
Akron	225	393,645	223	335,650
Fort Wayne	89	278,355	93	352,640
Youngstown	83	261,465	88	341,120
Cedar Rapids, Ia.	43	258,000	33	330,000
Evansville	98	211,632	115	181,271
Peoria	47	142,245	34	244,680
Des Moines	60	127,750	83	139,150
East St. Louis, Ill.	52	124,673	54	38,028
Topeka	37	113,655	69	96,110
Lincoln, Neb.	44	101,650	43	104,050
Sioux City, Ia.	59	100,085	54	126,970
Davenport	33	79,250	34	99,150
Kansas City	80	67,140	52	56,280
Springfield, Ill.	28	52,385	35	181,435

Not much uniformity is present in the case of the cities of the southern section of the United States. Dallas and San Antonio report increases of 34 and 16 per cent respectively. Atlanta, Ga., records a decrease of 32 per cent, while Savannah leaps into prominence with an increase of 537 per cent. Louisville, Ky., loses 10 per cent, and Covington 13. New Orleans shows a loss of 11 per cent. Memphis, Tenn., loses 55, while Chattanooga gains 6 per cent, and Nashville in turn loses 41. Norfolk, Va., gains 60 per cent and Richmond loses 71. Birmingham, Ala., falls far short of the figures of last year with a loss of 48 per cent.

SOUTHERN STATES

	1913		1912	
	No. of Buildings	Estimated Cost	No. of Buildings	Estimated Cost
Dallas	165	\$469,925	142	\$351,225
Atlanta	309	384,723	356	568,587
Louisville, Ky.	243	197,170	204	330,970
Charlotte, N. C.	24	292,937	26	78,510
Memphis	273	288,355	314	644,515
Birmingham	403	242,099	263	470,262
Savannah	68	194,740	25	30,560
New Orleans	..	186,769	..	211,170
San Antonio	258	176,128	280	151,592
Jacksonville	117	164,825	76	169,415
Norfolk, Va.	51	157,200	50	97,740
Richmond, Va.	34	85,883	57	303,333
Covington, Ky.	32	69,685	30	80,719
Tampa, Fla.	126	53,055	121	53,891
Chattanooga	161	50,120	187	53,480
Nashville, Tenn.	39	49,390	46	84,144

The cities of the western portion of the country are about evenly divided between gains and losses. The most notable gain is that in the case of Spokane with an increase of 215 per cent. San Francisco gains 28 per cent and Portland, Ore., 78. Seattle makes a modest gain of 14 per cent, and Sacramento makes the same increase over the figures of September, 1912. Berkeley holds its own with a gain of 2 per cent. Pueblo and Colorado Springs make substantial gains of 72 and 43 per cent respectively. San Jose, Cal., gains 11 per cent; Los Angeles makes a poor showing with a decrease of 24 per cent, and Oakland records a decrease of 45 per cent. San Diego loses 77 per cent and Tacoma 44 per cent. Salt Lake City continues the depression which it has shown for some months with a decrease of 36 per cent. Stockton, Cal., shows a decrease of 66 per cent, as compared with the figures of September, 1912.

WESTERN CITIES

	1913		1912	
	No. of Buildings	Estimated Cost	No. of Buildings	Estimated Cost
San Francisco	386	\$2,273,723	544	\$1,783,145
Los Angeles	1387	1,748,665	1393	2,310,517
Portland, Ore.	667	1,621,005	1185	909,595
Seattle	939	692,885	958	607,870
Spokane	79	678,715	87	214,515
Oakland, Cal.	354	456,425	369	839,440
San Diego	253	352,560	248	1,596,859
Sacramento	116	330,797	96	289,365
Tacoma	194	157,842	163	282,840
Berkeley	77	147,050	87	144,000
Salt Lake City	76	142,937	69	226,375
Pasadena	170	140,803	148	140,432

BUILDERS' APPLIANCES AND EQUIPMENT

Some Things of Seasonable Interest to Those Having
to Do with the Building Business

Growth of the Beaver Board Companies

It required many years to firmly establish certain principles concerning the manipulation of pure wood fiber, but upon the facts developed has been built up a successful industry for the manufacture of a building material designed to take the place of lath, plaster and wallpaper in all kinds of buildings, new or old—the Beaver board industry which has a significant place in the building world. The material turned out by the Beaver Companies is referred to as durable, sanitary and artistic, and is known under the trade mark name of "Beaver Board." Its use is rapidly extending not only in the United States, but in Canada, and although there is a plant at Ottawa, the headquarters of Beaver board activities, the need for a new plant has become evident. As a result there is now in process of construction new works at Thorold, which are estimated to cost something like \$500,000 and will have a capacity output of some 60 tons per day. The main build-

operations upon which were commenced last April, will be ready for operation by April, 1914. The building of this, the fifth and latest plant, marks an important step in the growth of Beaver board industry, the companies now having branches and plants at five points, with more than 300 distributors and 7,000 dealers the world over. The enterprise represents a total investment of some \$2,000,000.

The five plants and offices are at Buffalo, N. Y., at Roanoke Rapids, N. C., at Ottawa, Canada, the headquarters of Canadian Beaver board activities, and at Thorold. There is an English branch at 4 Southampton Row, W. C., London, England.

Berger's Metal Shingles and Spanish Tile Roofing

Metal roofing tile is now being reproduced which is an exact pattern of the original clay Spanish tile and makers



Growth of the Beaver Board Companies—Fig. 1—General View of the Foundations for the New Plant at Thorold, Canada

ing is 74 by 350 ft. in plan, with an addition 150 by 150 ft. at the south end and measuring 74 by 150 ft. at the north end. In the halftone engraving, Fig. 1, we show the foundations for the new plant in progress.

Thirty carloads of wood fiber machinery, most of it the parts of one machine, have gone forward from the Sandy Hill Iron and Brass Works, Hudson Falls, N. T. This machine will extend the length of the main building, the dimensions of which are given above. In order to operate the plant arrangements have been made for 2,300 horsepower from the Ontario Power Company for a period of 30 years, but it may be stated that about 5,000 horsepower will eventually be required.

The Beaver Companies expect that the Thorold plant,

of the sheet metal product call attention to the light weight of that material which is a very important consideration in connection with the question of freight shipment. Some new designs in this class of material are well illustrated in a new catalogue of the Berger Manufacturing Co., Canton, Ohio, in which colored half-tone cuts are used to show the different styles of tile and their adaptability for use in various classes of construction work. These Spanish tile sections and metal shingles are furnished in either Toncan metal, or open-hearth steel. The former is a sheet metal product made from an iron ore base and for which the manufacturer claims superior rust and corrosion-resisting properties. The brands known as Chieftain and Swanee metal shingles are also manufac-

tured of terne plate of any standard weight of coating. The construction of the tiles provides for expansion and contraction. It is claimed that the weight of a metal section is about one-eighth of that of similar designs manufactured of clay, thus permitting the use of a lighter roof framing. In laying the metal shingles the section is locked into the adjacent section and then nailed in position. The heads of the nails are covered by the next shingle, placed in position, and the ribs formed at the top of each shingle prevent the access of rain or snow. The metal shingles overlap the ribs on eaves finish and give a starting point for the first course of shingles. Several different styles of ribbed and hip capping, valleys, terminals and finials are shown. In laying metal shingles it is recommended that the start be made at the lower left-hand corner of the roof section. The first course is laid so that the shingles project over the eaves about 1 in. or more, a chalk line being used to keep the course straight at the bottom. At the end of the building (except when gable and finish is used, the tile is allowed to project about 1 in. over the verge-boards and the sides are turned down and nailed. In laying the second and subsequent courses every alternative course is started with a half tile to break joints.

Something About Wodwalboard

Among the later candidates for popular favor in the way of a wall board designed to take the place of both lath and plaster, is the product which has been placed upon the market by the McHenry-Millhouse Mfg. Company, South Bend, Ind. It is referred to as "the modern building board for building purposes" and is offered under the name



Fig. 2—Interior View of Room, Showing Ease of Application of the Board

unlimited and as showing some of its applications we present herewith two illustrations, Fig. 2 showing "Wodwalboard" being nailed to studding and clearly indicating how easily one man can do the work, while in Fig. 3 is shown a "Wodwalboard" garage. The manufacturers state that the saving is about one-half as compared with the cost of other material.

Metal Store Front Construction

The "Petz" corner posts and transom bars for use in the construction of store fronts are illustrated in a 32-page booklet, issued by the Detroit Show Case Co., 476 West Fort street, Detroit, Mich. A large number of different styles of bars are illustrated with half-tone cuts and cross-sectional views. The metal is applied to these moldings by a special process which holds it very securely in place against the supporting wood.

Choosing the Building Material to Suit the Job

A handy binder, containing samples of the various kinds of roofing materials, waterproof building paper and felts, made by F. W. Bird & Son, 110 River Street, East Walpole, Mass., has just been issued. Proslate roofing is one of the Neponset brands shown, which is especially designed for cottages and residential work of all kinds. It is a prepared roofing made in rich brown and deep green shades, which render it especially desirable for use on pitched roofs. It is also well adapted for piazza roofs where shingles cannot be used. Proslate roofing and siding is manufactured in rolls 18 in. in width, each roll con-

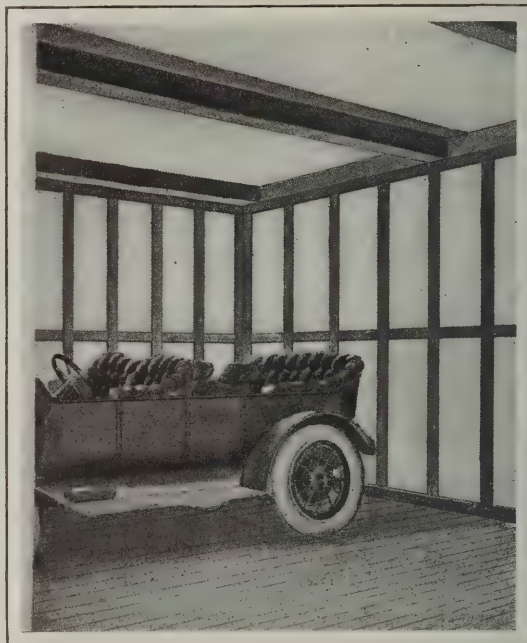


Fig. 3—Showing Use of the Wall Board in the Construction of a Garage

Something about Wodwalboard

"Wodwalboard." This material has a smooth surface which is said to be perfectly adapted for tinting or painting any color desired; it is not only light but strong; is fire-retarding; a sound-deadener; is ready for decoration as soon as nailed to the studding, and can be applied at any season of the year. It is made of the best selected material reduced to fibrous form and pressed into sheets of various sizes but of uniform thickness. It is especially adapted for building partitions in stores, factories, restaurants, garages, etc.; can be used for dividing rooms, adding closets, and for any remodeling or partitioning in apartment houses, office buildings, etc. The point is made that "Wodwalboard" can be used to great advantage and economy for bungalows and summer cottages, and can also be used in any building, public or private, in country or town. The material is nailed directly to the studding and ceiling joints in new rooms and over the wall covering in old rooms. It can be cut in any size with a fine saw and can be applied by any man who is handy with tools. In order to secure the paneled effect now so much in vogue, the joints between the sheets of "Wodwalboard" are covered by a decorated strip of wood, the thickness and width of which depends entirely upon the size of the room and the panel effect desired. The manufacturer points out that the field for "Wodwalboard" is practically

taining sufficient roofing to cover 100 sq. ft. of surface. Rust-retarding clips, nails, and cement of the color of Neponset Proslate, together with complete directions for laying are packed inside of each roll.

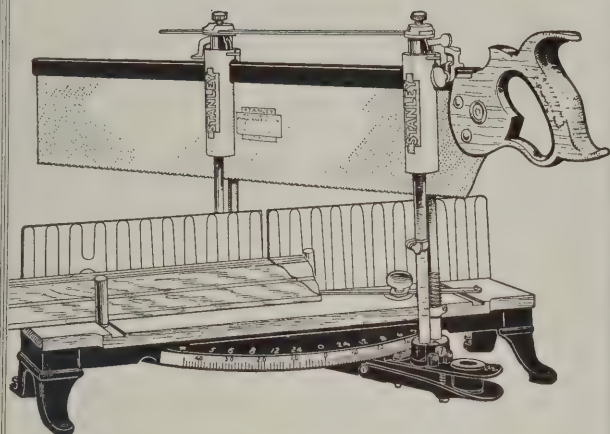
The highest grade building paper shown is sold under the trade name of Neponset Red Rope roofing and building paper and is prepared in rolls 36 in. in width and ranging in quantity from 500 to 100 sq. ft. The statement is made that this material is frequently substituted for back plaster and that it is suitable for a roofing and siding on sheds and other outbuildings. The Neponset black waterproof building paper is coated on both sides with a stainless waterproof preparation. Florian sound-deadening felt is used in apartment buildings and other structures where sound insulation becomes a very important problem.

Durability of a Disston Saw

A striking illustration of the durability and continued efficiency of a Disston saw is found in the experience of an expert carpenter at Nanticoke, Pa., by the name of Charles Nadolney. It appears that some eleven years ago he purchased a Disston saw to use in his daily work and ever since that time it has been doing faithful service. A

(Continued on page 44)

Stanley Tools



Stanley Mitre Boxes

STRONG—DURABLE—ACCURATE

A Few Striking Features

Saw is held above work when not in use.

Swivel is automatically locked at any angle.

Two sockets in swivel for use of long or short saw.

Narrow opening in back of frame, especially adapted for small work.

Steel rod uprights for saw guides.

Uprights adjustable for saws of varying thicknesses and for those that run out of true.

Stock guides for holding work in place.

Extra wide range of work—will saw at angle of 30 degrees.

One-Piece frame with detachable Malleable iron legs.

Construction thoroughly mechanical; all parts interchangeable and readily replaced if lost.

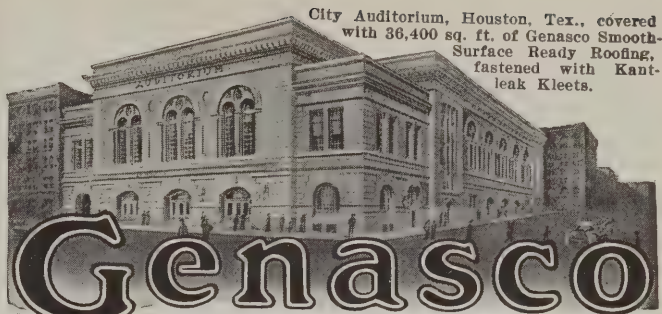
Quickly and easily put together or taken apart for carrying.

A specially made Back Saw furnished with each box.

SEND FOR SPECIAL CIRCULAR

— ADDRESS —

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.



Genasco

THE TRINIDAD-LAKE-ASPHALT
Ready Roofing

If you want to be sure of an ever-tight roof be sure its waterproofing is Trinidad Lake asphalt.

Trinidad Lake asphalt is "Nature's everlasting waterproofer"—noted for its uniform and lasting quality. And only with roofing that is lastingly waterproof can you expect to get lasting protection.

Genasco Roofing is Trinidad Lake asphalt in the right form to give resisting and enduring power to roofs. Our experience (beginning as pioneers over thirty years ago) in the use of asphalt goes in Genasco. And this combination makes roofing that withstands the rain, sun, wind, hail, snow, heat, cold, and fire.

Go deeper than the looks when you select roofing. Get Genasco and you get roofing with real, permanent waterproofing.

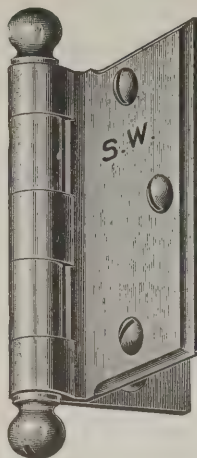
Guaranteed. Mineral or smooth surface—several weights. The **Kant-leak Kleet** is in every roll of Genasco smooth surface roofing. Beats cement and large-headed nails for waterproofing the seams. Write us for the Good Roof Guide Book and samples, free.

THE BARBER ASPHALT PAVING COMPANY

Philadelphia

Largest producers in the world
of asphalt and ready roofing
New York San Francisco Chicago





Time and Labor Saved and
the Owner Satisfied

**STANLEY'S
No. 165**

Ornamental Surface Butt

BEVELED EDGE
UNEQUALED IN QUALITY

With these Butts it is not necessary to mortise the door, as the ornamental leaf screws on the surface.

The Butts can be changed to either right or left hand by simply unscrewing the slotted tip and reversing the pin. Sizes $1\frac{1}{2}$ to $4\frac{1}{2}$ inches.

The Guaranty



of Quality

Write us for a Handsome Booklet of
Wrought Steel Hardware

Department E.

THE STANLEY WORKS
NEW YORK NEW BRITAIN, CONN. CHICAGO

few years ago it fell from the second story of a building on which he was working, but the only damage it received was a broken handle. Not wishing to part with the saw he purchased another handle and after attaching it found the old blade as good as ever. On June 6, 1913, Local Union No. 414 of Nanticoke Carpenters and Joiners of America gave a "Smoker," the principal event of the evening being a sawing contest open to all. The only conditions imposed were that the successful contestant should cut a piece off a 6 x 8 in. hemlock stick inside of $2\frac{1}{2}$ minutes without a square or mark of any kind to guide him. The man making the squarest cut under these conditions was to receive a set of Disston saws.

Mr. Nadolney entered the contest with the saw which had seen eleven years of hard usage, and although there were many contestants with other brands of saws both old and new, he easily won the prize. He made a square cut on the 6 in. way of the stick and when the cut was completed it was found that he was only $1\frac{1}{32}$ of an inch out on the 8 in. way. This was the best cut of the evening and the set of saws was unanimously awarded to him.

Stearns No. 2 Miter Box

Many of our practical readers will doubtless be interested in the miter box which we illustrate in Fig. 4 and which has recently been placed upon the market by E. C. Stearns & Co., Syracuse, N. Y., and patents covering which are now pending. A special feature of this miter box and one which the manufacturer regards as superior to any other of similar make is that the saw guide is held rigidly in place at the various miters by a steel lever. This lever in turn is held firmly in position by a steel spring. The pressure of the spring on the lever takes up any wear on the saw guide or the post which supports it. The boxes are made of laminated wood from selected

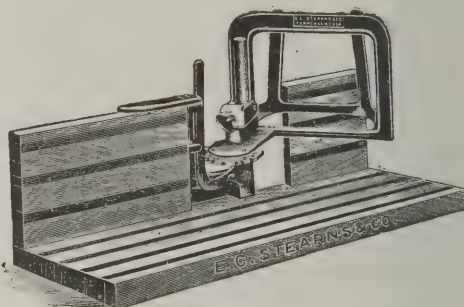


Fig. 4—General View of the Stearns No. 2 Miter Box

stock, finished in natural colors and varnished. The metal parts are finished in gold bronze with the exception of post and index plate which are in gun metal finish.

The miter box here shown is intended for either back or panel saws and may be quickly set to accurately guide the saw in a square cut or at $22\frac{1}{2}$, 30 or 45 degrees, right or left. The graduated plate is of hardened steel, as is also the indexing lever. The saw guide is sufficiently long to insure accuracy and with long central bearing post and the screw clamping device liability to looseness is eliminated. For cutting to exact depths a back saw is used, the back rib of which rests on the shoulder within the swinging saw guide. The company has issued a 1913 catalogue of its hardware specialties and among the pages the No. 2 miter box here shown as well as others are illustrated and described.

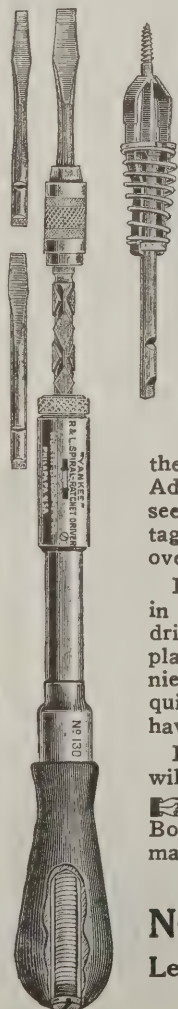
Evening Course in Trade Teaching at Pratt Institute

In a circular recently issued for use in answering inquiries from prospective members of a new evening course that Pratt Institute, Brooklyn, N. Y., is now offering to trade workers, who wish preparation for teaching their trade, the statement is made that this is one of the first institutions in the country to offer an evening course in which a trade worker may without interference with his daily occupation obtain the requisite preparation for teaching. The extension of industrial education in the country is creating a strong demand for experienced journeymen to teach their trades in the industrial and trade schools. Of the latter there is now a large number in the country and they are rapidly increasing. Seven states have already passed legislation establishing such schools and at least six more states are expected to pass similar legislation in the coming year. These schools are all taking their shop instructors from the trades.

The circular points out that the trades which are in particular demand embrace carpentry, cabinet making, pattern making, electrical work, sheet metal work, printing, machinists' trade, plumbing, repair work, etc.

The evening class at Pratt Institute, which commenced

(Continued on page 46)



With These Two "Yankee" Tools

(Quick Return No. 130)
(and Screw Holding Bit)

you can drive or draw a screw 3 feet overhead, in tight corners, or most any other out of reach place. Besides this, you get the same service as with the famous No. 30, which you doubtless now have in use. The No. 130 "Quick Return" shown here has a spring in the handle which quickly drives the spindle back for the next stroke. Add the Screw Holder to this and you see at once what a tremendous advantage you have in this tool, especially in overhead work.

It also permits you to hold the work in the one hand while you start and drive the screw in some out of reach place with the other. For all convenient and close range work this is the quickest "Yankee" Screw Driver we have yet put out.

If your dealer cannot supply you, we will mail you the two for \$2.25.

Write us for the "Yankee" Tool Book. It tells about every tool we make. A postal brings it.

NORTH BROS. MFG. CO.
Lehigh Ave. Philadelphia, Pa.



When the man about to build

consults you regarding the kind of roofing to be used, you take no chances if you recommend and sell him

(Quality
Cert-ified)

Certain-teed Roofing

Rolls and Shingles

(Durability
Guaran-tee'd)

Guaranteed 15 years—lasts longer Certain-teed Roofing has won out on its own merit—it has made good on the roof, not only in Canada, but in all countries and in every climate throughout the entire world.

Certain-teed Roofing for all kinds of buildings

There is a simple method of applying Certain-teed Roofing on any kind of a building. For residences, garages, barns, factories, use Certain-teed Roll Roofing—Certain-teed Shingles for bungalows, residences, summer cottages, etc.—Certain-teed Specification Roofing for skyscrapers, apartment buildings and all large surfaces.



Accept no substitutes

Don't confuse Certain-teed with ordinary "make-shift" roofings—we guarantee it for 15 years and inside each roll furnish modern ideas for laying it artistically and permanently.

See that the Certain-teed Quality Label is pasted on the back of every Roll and Crate of Shingles—it is placed there to protect you and your customers.

Certain-teed Roofing is used everywhere—recommended by leading dealers and contractors—sold at a reasonable price.

General Roofing Manufacturing Company

WINNIPEG, CANADA

E. St. Louis, Ill.

York, Pa.
Kansas City

Marselles, Ill.
San Francisco

Memphis
London, England

Minneapolis
Hamburg, Germany

New York

Hurry Up! Get Yours!

I've got a Monarch Patent Cornice Mould all packed and ready to send to you by parcel post as soon as you send me your address.

I know you'd like to decorate your own parlor or dining room with a nice, fancy plaster cornice. Or, perhaps, you'd like to do an extra nice job in some house you are building now. Here's your chance. It won't cost you anything. I'm going to send you this tool just to show you what a good one it is.



DON'T SPEND A CENT

I'll send you the Monarch Cornice Mould on Ten Days' Free Trial. You don't have to buy it, but I want you to try it. Use it all you want to. If you'd like to buy it, I'll sell it to you, but I want you to test it first and prove to your own satisfaction that you won't be throwing good money away if you buy a Cornice Mould.

THE MONARCH PATENT CORNICE MOULD

consists of an aluminum frame fitted with the best red birch guides and black cherry handles. It is light and strong. Ten assorted blades and a blade scraper complete the set. Each blade is made of white pine. The edge is of zinc encased in the wood. The pine is specially treated so plaster or water will not affect it. This tool will make straight cornices and perfect corners quicker, easier and better than you have ever seen it done. The saving in time is wonderful and the work beyond comparison. It requires no special skill to use this Cornice Mould. You can handle it as well as I can.

DON'T SEND ANY MONEY

Just send me your name and address. Tell me you want the Monarch Cornice Mould on Ten Days' Free Trial. Use it ten days and if it don't please you, send it back, that's all.

Get Your Cornice Mould Quickly by Writing Today

TIMOTHY F. HORAN, 10 Maple St., COOPERSTOWN, N. Y.

Please quote BUILDING AGE when writing to advertisers.



Complete Set Consists of
Blade Holder, 10 Blades and
Blade Scraper

Black Diamond File Works

ESTABLISHED 1863

INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file
user upon application.

G. & H. Barnett Company

Philadelphia, Pa.

Owned and Operated by Nicholson File Company.

"Solid as a Rock"

Stearns Detachable
Mitre Box No. 2

Quickly set to accurately guide the saw in square cut or at either 22½, 30 or 45 degrees right or left.

The lever is held in place with a spring, which also serves the purpose of taking up all wear.

The notches in the index plate hold the saw guide securely at the different mitres. Made for either

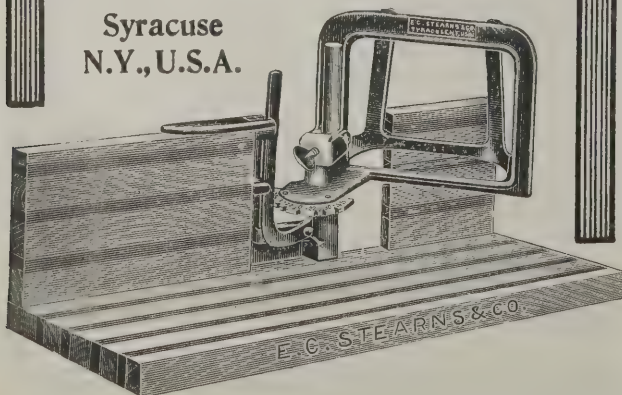
Back, Panel or Hand Saws

Hardened, graduated steel plate. Long saw guide and long central bearing pivot with secure clamping device. All the operations in plain sight.

If unable to secure it from your dealer, write us. Price \$2.00 each.

E. C. Stearns & Co.

Syracuse
N.Y., U.S.A.



October 1, is taught by a man who has had extended experience as an instructor in an industrial school and as the director of one of the leading Massachusetts schools. The class meets three nights a week, two nights being given to instruction in the "tricks" of the teaching trade and methods of teaching in all industrial schools, while the third night is given to actual practice teaching in the New York evening trade schools under the supervision of the instructor of the class.

It is stated that the class will do four things for the student:—It will give him a chance to find out before he gives up his present job whether he will probably like teaching and is adapted to such work; it will put him in touch with teaching positions which is absolutely necessary under any circumstances in order to get a position as a teacher; it will provide him with the training and teaching experience necessary to make him eligible for the position of teacher in an industrial school, and finally it will give him an insight into how to teach.

A New "American" Saw

The question of tools and machines adapted to the use of the carpenter-contractor and the builder as an adjunct of his woodworking shop has received no little study at the hands of the management of the American Woodworking Machinery Company, 591 Lyell Avenue, Rochester, N. Y., one of the oldest woodworking machinery concerns in the country. The result of this study is the new "American" Precision saw illustrated in general view in Fig. 5, and which is especially adapted for use in the shop of the carpenter-contractor or builder where a great

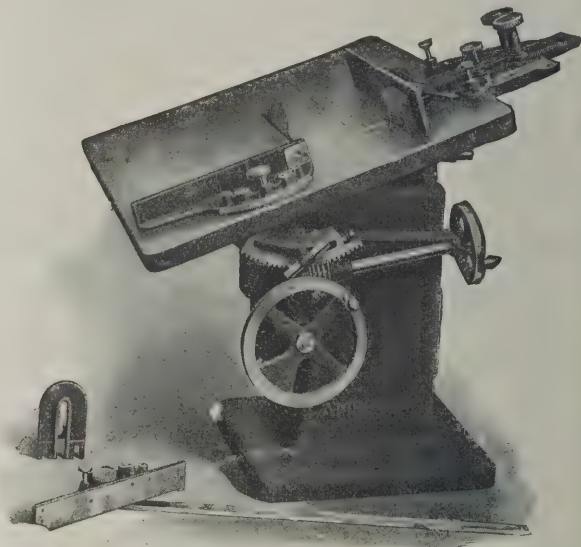


Fig. 5—View of New "American" Saw Showing Tilt of Table

variety of work is done. The adaptability of this machine to either ripping or cross-cutting without changing saws enables the operator to shift from one kind of work to another without any appreciable loss of time. This fact in conjunction with the carefully constructed gauges which are scaled for quick and accurate adjustments without the use of rule or compass, facilitates the work to a very marked degree. The company has just issued a descriptive circular, the basis of which is the machine here illustrated, and we understand that a copy of it will be sent to any carpenter-contractor or builder among our readers who may be interested in this new saw.

The Monarch Patent Cornice Mold

At this season of the year there are thousands of buildings which have been so far advanced in their construction as to be ready for finishing inside and in many of them the rooms will have ornamental plaster cornices. Those who are engaged in doing this sort of work cannot fail to be interested in the Monarch Patent Cornice Mold which has been brought out for the purpose of facilitating the operation by Timothy F. Horan, 10 Maple Street, Cooperstown, N. Y., and illustrations of which were presented in *The Building Age* for July. The mold consists of an aluminum frame fitted with red birch guides and black cherry handles. A complete set consists of ten assorted blades and a blade scraper. Each blade is made of white pine and the edge is of zinc encased in the wood, the latter being specially treated so that plaster or water will not affect it. It is pointed out that this tool will make straight cornices and perfect corners quicker, easier and

(Continued on page 48)

Roofing Bargains —Great Fall Sale!

Huge Stock—'Way Below Market Prices

We are among the largest buyers and sellers of Roofing in the World. Our tremendous purchases have put us in a position to offer Contractors and Carpenters the best grades of guaranteed Roofing at a big reduction from market prices.

We list here some of our famous brands, offered during this great Fall Sale at bargain prices which no builder who uses Roofing can afford to overlook.

Orders will be filled direct from this advertisement under our usual guarantee of Quality, Safe Delivery, Goods as Represented and Absolute Satisfaction or every penny refunded.

"Quality" Rubber Guaranteed Roofing



\$1.25 Per Roll. The remarkable wearing qualities of this splendid Roofing are universally conceded. It is elastic, pliable and tough.

Guaranteed not to contain an ounce of tar. Made of heavy, strong, long-fibre felt, thoroughly saturated with asphalt.

1-Ply	2-Ply	3-Ply
Weight 35 lbs.	Weight 45 lbs.	Weight 55 lbs.
Price per roll of 108 sq. feet	Price per roll of 108 sq. feet	Price per roll of 108 sq. feet
\$1.25	\$1.50	\$1.80

"Jap-a-Top" Slate Surfaced Roofing



\$2.25 Per Square. Furnished in two colors—Red or Grayish Green. This extra fine Roofing combines beauty, durability and economy.

Makes artistic roofs for fine residences, bungalows, garages, etc.

The weather side is surfaced with *Chip Slate*. Gives a rich pebbled effect. *Strong, rich colors—*

NEEDS NO PAINTING. Will outwear wood shingles.

PRICE per square of 108 square feet, \$2.25. Roll weighs 80 pounds.

Composition Roofing "JAP-A-TOP" Slate Burlap Reinforced Rubber Roofing

(Not Guaranteed)

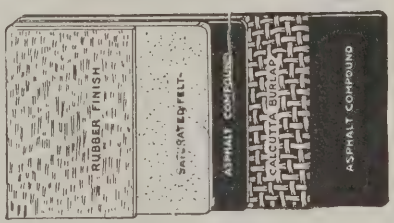
80c Per Roll. If you want something "dirt cheap," for use on temporary buildings—*here it is!* Local dealers ask \$1.50 to \$2.00 per roll for the same roofing.

Furnished in Red or Grayish Green. Never need painting. "Jap-a-Top" Shingles are made 8 x 12¾ inches, packed in crates. Each crate contains shingles to cover 100 square feet.

Weight, 220 pounds.

Use ordinary roofing nails.

Price per square, 424 shingles (crated), **\$4.50** choice of Red or Grayish Green



Combines the strength of felt roofing with a reinforced piece of heavy burlap. Saturated with mineral rubber compound. Will last from 15 to 20 years. Price per square of 108 square feet..... **\$2.85**

Roofing Nails and Cement for Seams
FREE in Every Roll of Our Roofing

We are making a big cut on high-grade, guaranteed Storm Sash and Doors. *Worth looking into.*

Order Direct From This Adv. or Write for Big Free Catalog

If you are in the market for Roofing, *better get your order in at once*, while we are prepared to ship from stock. And don't forget that our proposition on Storm Goods means money in your pocket.

Gordon-Van Tine Co., 671 Federal St., Davenport, Iowa

TIGHT

If you would take a glass bottle, put a glass stopper in it and then melt the glass top and the stopper together, so it would be like one solid piece of glass, you would have a vessel that would be **tight**.

What would you think of a **STEEL FURNACE** made just as tight as that; one that had all joints all melted together like the glass in the bottle, without any riveted or bolted seams, or slip joints, or sand joints, such as you find in ordinary furnaces, and which have given cause for putting furnaces in a class by themselves as "dusty" and "dirty?" Well, the **Hess Furnace** is built that way; the steel plates forming the body of the furnace are clamped together and are then melted in that position so that they fuse together and become like one solid piece of steel. No leakage there, **never, never**. Expansion and contraction won't open these joints, and gas and dust never will get out.

It is a wonder, too, how long a furnace made that way will hold the fire; with wood or hard or soft coal or slack, or even rubbish. You can shut it up tight and the fire will just hold there for hours and hours, for fire will not burn without air, and if air doesn't leak in there will be very little combustion.

Our space here is limited, and we can't tell you much more about the **Hess furnace** here, but we have a forty-eight page booklet which tells you all about it, and if you are interested just ask us for one, and it will come to you, free.

We sell our furnaces direct from factory to consumer. The price is less than dealers charge and the service is better than any dealer can give. Send us a rough sketch of a building you want heated, and we will send back a plan made by a draftsman, showing how it would be heated, with an estimate of cost. No charge for this but it's worth money to you.

We sell on trial, too, so that your money doesn't get to us until you have tested the heater and are satisfied.

Want to hear more?

Hess Warming and Ventilating Company
1201 Tacoma Building, Chicago, Ill.

better than heretofore, while there is a great saving in time. Mr. Horan states that he will send the Monarch Cornice Mold on ten days' free trial to any reader of *The Building Age* who may request it.

Buying a Floor Scraper on the Installment Plan

Those carpenters, builders or contractors who wish to secure a floor scraper on easy terms will be interested in the proposition of John F. Weber, president of the Weber Mfg. Company, 672 Seventy-First Avenue, West Allis, Wis. He points out that by reason of his extensive establishment for manufacturing floor scrapers and employing the best mechanics to be had on this class of work, he will, for a limited time only, accommodate contractors and carpenters by granting term payments that exceed but very little the amounts generally asked as rental on inferior machines. As to the economy of using his double-acting floor scraper, Mr. Weber contends there is no comparison between its work and hand work, either in speed, ease of operation or quality. His records show conclusively that putting the daily saving over hand work at \$8 is conservative indeed. In fact, he points out that the gain made on the floors of two buildings pays for the scraper. The quality of work is of a high order. Whether the scraping be done with or against the grain the surface is said to be left as smooth as ivory and free from all traces of waviness. Mr. Weber wants one responsible carpenter or contractor to represent him as agent in each town and those interested will receive copies of some interesting literature if they will drop him a line at the address given above. This would seem to be a good opportunity for many to fill in spare time during the coming winter months.

Voltz Private Telephone Directory

A handy telephone number reminder has been placed in the hands of users of the Universal Sash Bar by the Voltz Manufacturing Co., 914-916 Penn street, St. Joseph, Mo., manufacturers of that product. This "reminder" or "private telephone directory" is neatly bound with brass and fitted with a brass chain with which to hang it in a convenient place beside the telephone.

Spaces are provided under different letters of the alphabet for the insertion of telephone numbers to which most frequent references are made during the course of the day's business. This little device which also serves as a little reminder of the Universal system of plate glass store-front construction will be sent to any applicant who mentions *The Building Age* in his letter.

Cypress Lumber and Its Uses

There are numerous species of cypress and as many qualities as there are species; in fact there are almost as many grades of this wood as there are localities in which it grows. The wood of each locality possesses its own peculiarity. According to a booklet recently issued by the A. T. Stearns Lumber Co., Boston, Mass., that grown near the coast of the Gulf of Mexico and known as "Gulf cypress" is of high quality and burns very slowly, making it especially desirable as a material for roof shingles. The cypress is a species of cedar and like all woods of this class has a very distinct and beautiful grain, which makes it suitable for use as interior trim. Cypress is used to a considerable extent for floors for residences, where the latter are not to be subjected to excessive wear. Cypress is much used at the present time in the manufacture of doors. Because of its lasting quality it is especially desirable for use in the manufacture of porch columns.

The Starr Specialty Manufacturing Company

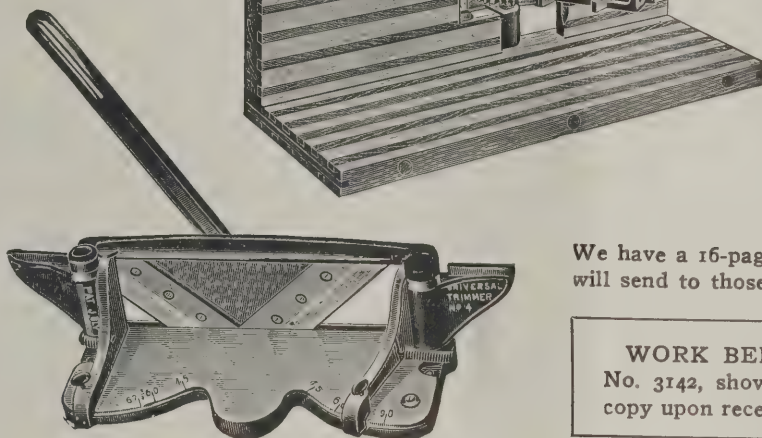
The El Starr Manufacturing Company, Milwaukee, makers of "Perfection" grinders, and the Auto Specialty Manufacturing Company, of the same city, makers of "Ajax" spark plugs and auto accessories have moved to more commodious quarters at 227-233 West Erie street, Chicago, Ill., and the two firms have combined under the name of the Starr Specialty Manufacturing Company. The better shipping facilities and larger quarters which were obtainable in Chicago are given as reasons for the change. Additional capital has been added and the firm expects to increase the number of its lines at once.

C. E. Hughson, who has been connected with both firms under their old names is president and manager of the new company. Selling agents who have represented the El Starr Manufacturing Company in the past will continue to handle the output of the new plant. These firms are as follows:

Benj. S. Alder, 37 Warren Street, New York, N. Y.
Wm. P. Vrooman, Cleveland, Ohio.
John A. Gregg Company, Burlington, Iowa.

(Continued on page 50)

MITRE BOXES MACHINES TRIMMERS ETC.



We have 16 styles and many sizes; from the ordinary old-fashioned wooden mitre box up to the Marsh-Langdon all-metal machine to cut any angle; including Hand and Foot Mitres, Trimmers, etc.

We have a 16-page catalog showing them all which we will send to those who specify Catalog No. 3141.

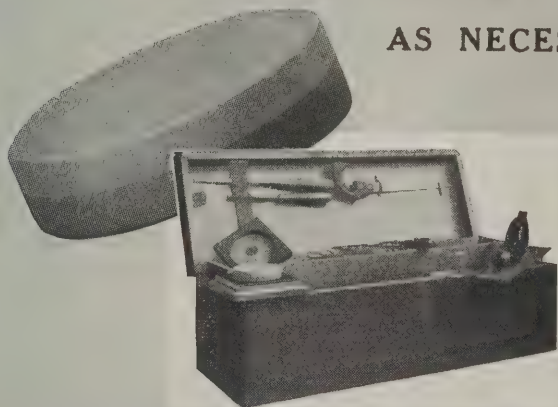
WORK BENCHES: We have a new catalog No. 3142, showing 23 distinct styles. Will send copy upon receipt of request.

HAMMACHER, SCHLEMMER & CO.

HARDWARE, TOOLS AND SUPPLIES

NEW YORK, Since 1848

4th Ave. & 13th Street



AS NECESSARY AS A SAW OR A HAMMER
IN YOUR TOOL KIT

Carborundum Sharpening Stones

Quick, clean-cutting stones, that bring the edge to the tool with just a few strokes. **AND THEY CUT THE EDGE ON THE TOOL—THEY DON'T MERELY RUB IT ON** Every stone positively uniform in grit and hardness, holds its shape, shows long life. The round Carborundum Combination Bench Stones for general tool sharpening, the beveled edge slips for touching up gouges, carving bits, etc.—the extra hard, extra fine Carborundum stones for that finer edge for your finer tools.

EVERY STONE IS GUARANTEED

ASK YOUR HARDWARE DEALER

THE CARBORUNDUM COMPANY

NIAGARA FALLS, N. Y.



The Economy of Good Tools

is a fact so well known that you do not need to be reminded of it. The only problem in your mind is what tools best represent true economy. It is a problem of easy solution, for

DISSTON Brand Goods

Quality Guaranteed

have withstood the hardest test of all—the test of time.

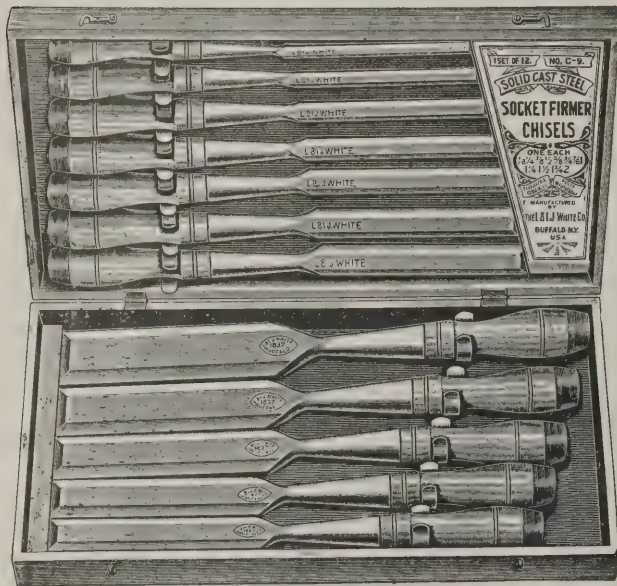
Aside from the long record of Disston Saws, covering several generations, you will find that nearly every Disston tool, embracing trowels, plumb and levels, try squares, bevels, screw drivers, etc., has an efficiency record of anywhere from 25 to 50 years or longer. During those periods of their manufacture the demand has steadily increased, and is increasing more than ever today. True economy in tool-buying means looking for the Disston name and trademark.

Send five 2-cent stamps for Disston Hand Book—tells how to file saws.

HENRY DISSTON & SONS, Inc.

Keystone Saw, Tool, Steel and File Works
PHILADELPHIA, U. S. A.

Reg. U. S.
Pat. Off.



When You Buy—Buy the Best

Don't let anyone influence you to buy a cheap chisel—it is poor economy.

Ask for White's

"Just as good" means that you are the loser. If your dealer hasn't them, ask him to order them for you. We will be glad to send your dealer our general catalogue—tell him so.

The L. & I. J. White Co., Buffalo, N.Y.

Please quote BUILDING AGE when writing to advertisers.

Keating & Huggins Sales Company, St. Louis, Mo.
Hughson & Merton, Inc., San Francisco, Cal.
T. Mortimer, 64 Wellington St., W., Toronto, Canada.

Durable Factory Floor Construction

A new form of factory floor, comprising briefly the use of 1/16-in. metal strips placed between narrow boards so that the metal portion of the floor is always taking the brunt of the wearing action of the wheels of factory trucks, has been brought out by the Stanley Works, New Britain, Conn. It appears that this general form of floor was laid down in the Stanley plant some two years ago, and it has been so successful that the company has decided to make it as a marketable commodity, and has for this purpose applied for patents. To assist in gaining an idea of the construction, which seems to be well adapted

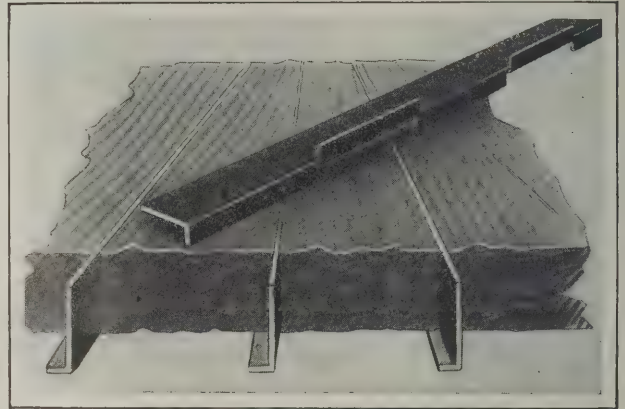


Fig. 6—A Durable Factory Floor Construction

for factories of all kinds where heavy materials are handled, the illustration Fig. 6 is given.

The metal portion of the flooring comprises strips of steel stock about 1/16 in. thick, bent for a length of 4 in., first to the right and then to the left and alternating as indicated, making a T section with the long member about 1 in. The metal is laid between wooden strips of the flooring, and the wood rests on the turned-over flanges of the metal. In the Stanley Works, the wood strips used are 2 in. wide and 1 in. thick, so that the top edge of the metal comes level with the surface of the floor. It is emphasized that the strips of wood are narrower than the width of the wheels of the trucks used in the factory, and it is preferable to have the wheels of the trucks a good deal wider than the strips of wood, so that the truck may always travel on the edge of the steel strips, as stated. The use of 1-in. wood stock instead of regular 1 1/4-in. flooring means, of course, a saving on this account, and the fact the boards rest on the steel makes it unnecessary to use grooved floor strips. The floor is laid directly on top of the heavy flooring timbers.

How to Estimate a Room for Wall Boards

Wall board is now being so largely used in interior construction that directions for estimating the quantity required to cover any given space are of interest. Such directions are contained in a booklet just issued by the Heppes Co., Chicago, Ill., and are in part as follows:

"In ordering wall boards, it is well to bear in mind that the latter come in long lengths which reach from the floor to the ceiling and clear across overhead in any ordinary room. The side wall boards should be ordered long enough therefore to reach from the floor to the ceiling and the ceiling boards should be ordered long enough to reach clear across the room the way the joists run. The side walls are put on last, so that the ceiling boards should be ordered long enough to reach clear to the wall studding, thus permitting the side wall piece to fit up snugly under them. To obtain the number of feet necessary for the space to be covered measure the width of the space in inches and divide it by 32 or 48 (depending on the width of boards to be used), which will give the number of feet needed. The height of the room or the length of the ceiling joists will be the length needed." These directions are applicable to the Utility board, made by the Heppes Co.

(Continued on page 52)



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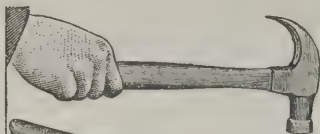
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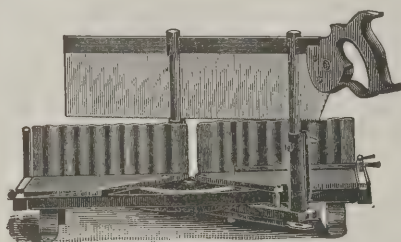


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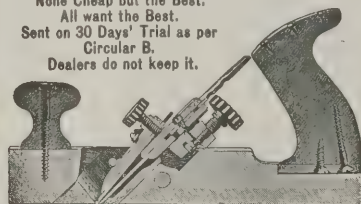
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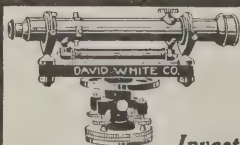
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Advantages and Conveniences of Installing Sliding Doors in the Modern Home

In the contest recently conducted by the Richards-Wilcox Mfg. Company, Aurora, Ill., in 200 word articles dealing with the subject indicated by the above title, the third prize went to H. H. Cahoon, an architect in Pittsburgh, Pa., and his contribution to the literature of the subject consisted of a series of verses which are of such a clever nature that we publish them herewith for the benefit of our readers.

They tell us there is not a thing
Beneath the sun that's new,
But you'll agree I think with me
When I present a few.

The first one and the foremost,
Our forebears gave no glance;
"Economy" applies to space
As well as to finance.

Take all those lovely palaces,
The entire old world o'er;
Not one of them, as you will find,
Contains a Sliding Door.

Much less an R-W hanger,
Another thing that's new,—
The acme of perfection,
A thing that's tried and true.

A sliding door's a wondrous thing,
It saves a deal of space;
And doesn't have the slightest chance
To strike one in the face.

Those swinging doors will cause mishaps,
If one neglects to look;
They'll cause "downfalls of china,"
And a very "Upset" cook.

An architectural point of view
Presents the matter thus—
We slide the doors of one room
And discover one room plus.

'Tis the duty of the architect
To specify this thing;
Which makes a door a better door
Without that needless swing.

To "efficiency," "convenience,"
And "Economy of Space,"
Add a Richards-Wilcox hanger
And the Ideal door's in place.

TRADE NOTES

Pearson Mfg. Co., Robbinsdale, Minn., calls attention to the fact that the price of its automatic shingle nailer is \$5.00 and not \$15.00 as stated in the last issue of this paper.

Oak flooring receives a thorough discussion in a booklet just issued by the Oak Flooring Bureau of the Oak Flooring Manufacturers' Association of the United States, from its headquarters 895 Hammond Building, Detroit, Mich. Grading rules are given, principles of estimating are considered, and the handling, laying and finishing of oak floors are treated under separate heads.

Chicago Machinery Exchange, 1220 to 1230 Washington Boulevard, Chicago, Ill., calls attention to the fact that it is headquarters for everything in the way of woodworking machinery especially adapted to the requirements of carpenter-contractors and builders.

The construction of moving picture theaters in every town in the country and the increasing number of fire restriction regulations in city ordinances designed to protect the public have resulted in the creation of a very large field for interior wall and ceiling coverings of sheet steel, and in meeting this increased demand many manufacturers have been stimulated to design artistic patterns which are well adapted for use in residences as well as in public buildings. The case in point is the Keighley Metal Ceiling & Manufacturing Co., 819 Locust Street,

(Continued on page 54)



This \$20 Draftsman's Outfit

exactly as illustrated, consisting of imported german silver drawing instruments in morocco case, drawing board, ebony lined mahogany T-square, two transparent triangles, german silver protractor, French curve, triangular boxwood scale, waterproof ink, pencil, ink and pencil erasers, erasing shield, pencil pointer, handmade drawing paper and thumbtacks. The instruments are manufactured by one of the largest makers of mathematical instruments in the world, and are guaranteed absolutely accurate.

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This complete Cyclopedia of Drawing, value \$20, included absolutely free if you enroll at once. This great work, consisting of four big volumes as illustrated, covers completely the entire work of the architectural and mechanical draftsman. Its value as an adjunct to the course we now offer cannot be estimated. Not only will you receive personal instruction from our expert draftsmen, but you will have these books at your elbow to settle immediately any question that may arise. The four volumes are bound in half red morocco, gold stamped, and contain 1,720 pages, 7 x 10 inches; 1,037 illustrations, full-page plates, diagrams, designs, etc.

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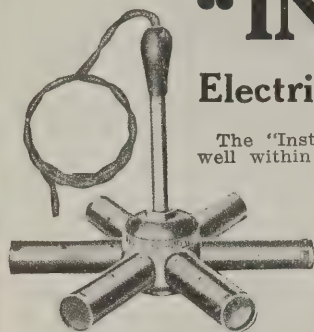
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embodying every practical, common-sense feature of all others, and these 2 features that no other saw set has: 1, adjustable side gauge to bring the point of each tooth under the anvil; 2, top clamp screw to regulate amount of set. Wearing surfaces made of hardened tool steel. Take advantage of the Parcel Post by sending \$1.00 for this attractive offer. We prepay postage.

Otis A. Smith

Rockfall, Conn.

Pittsburgh, Pa., which has issued a 140-page catalogue, bearing the title, "Artistic Interiors in Sheet Metal," and containing a large number of half-tone cuts with accompanying description, showing the remarkable number of applications to which sheet metal ceilings and side wall sections are adapted. An ingenious lock-joint system has been devised by this company which is said to produce an air-tight joint.

E. R. Stowell, New Corydon, Ind., calls attention to the fact that with his Fireproof Prime Coat, woodwork, shingles, wall board, etc., may be fireproofed, while at the same time any surface to which the composition is applied is given insulating qualities equal to asbestos. It is easy to apply and the statement is made that any good paint, varnish, enamel, calcimine or cold water paint can be used over it.

Charles Smith, of the Smith & Egge Mfg. Company, Bridgeport, Conn., has invented a new type of anti-skid automobile tire chain consisting of solid links and a patented lock which will be made by the Walker Chain Tire Company, which has established its business at the factory of the Smith & Egge Company.

Universal Portland Cement Company, Chicago, Ill., has just issued through its Information Bureau a third edition of "Concreting in Cold Weather," and also a third edition of that very interesting and attractive pamphlet entitled "Concrete Surfaces." Both are illustrated by means of well executed half-tone engravings.

One of the most novel uses perhaps to which sliding doors of a barn were ever adapted is their service as a stage curtain. During the summer months many cottagers and campers gather round Sherman Lake in New York State, and as facilities for amusement other than those provided by the surrounding country are scarce, the owner of a barn near the lake turned the structure into a unique theater. Benches and seats of the circus type were placed in the open air to accommodate the audience, while the central entrance of the barn was the stage. The big sliding doors which are opened wide in the haying season to allow the loads to enter, served as the stage curtain. This information together with a varied assortment of matter relating to barn door hangers, etc., is contained in the September issue of "DooR-Ways"—the house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill.

C. E. Jennings of the well-known house of C. E. Jennings & Co., 71-73 Murray Street, New York City, was chosen president of the American Manufacturers' Export Association at its fourth annual convention held September 25 at the Hotel Astor, New York City.

Incorporation papers have recently been filed with the Secretary of State for what is known as the Hecla-Winslow Company, Inc., which has taken over the Hecla Iron Works, of Brooklyn, N. Y., and the Winslow Brothers Company, of Chicago. Both of the companies are manufacturers of architectural and ornamental iron and bronze work for building purposes. The main office will be at Park Avenue and 40th Street, Manhattan, N. Y. The president is W. H. Winslow of the Chicago concern. F. D. Jackson, who has been first vice-president of the Hecla Company will continue with the new concern as the general Eastern manager.

The Waterloo Cement Machinery Corporation, Waterloo, Iowa, has recently opened an office at 11 Broadway, New York City, in charge of Parker V. Cole, who will cover New York and New Jersey in the interests of the concrete mixers turned out by this company.

A very complete catalogue of cutter heads has just been issued by Samuel J. Shimer & Sons, Milton, Pa., under the title: "Catalogue and Pattern Book No. 32." Various types of cutters are considered and cuts given showing cross-sections of the work which they will do. Aside from the listing of the product manufactured by the company, this publication contains much matter of value to the owner and operator of woodworking machinery.

Trimmer knives cannot be ground in the manner employed for ordinary knives, yet they are not hard to sharpen, if handled properly. In grinding trimmer knives, care should be taken to keep them cool by grinding slowly, otherwise the temper is apt to be destroyed. If the temper is spoiled on the edge, the only remedy is to grind back to the part where the temper has not been drawn, as trimmer knives cannot be retempered. In honing or sharpening on an oil stone all the sharpening should be done on the bevel side, and, in removing the wire edge, a hard flat stone only should be used, and even this should touch the surface very lightly. A good idea of the different types of trimming machines and their construction may be obtained from catalogue No. 85, just issued by the Fox Machine Co., Grand Rapids, Mich.

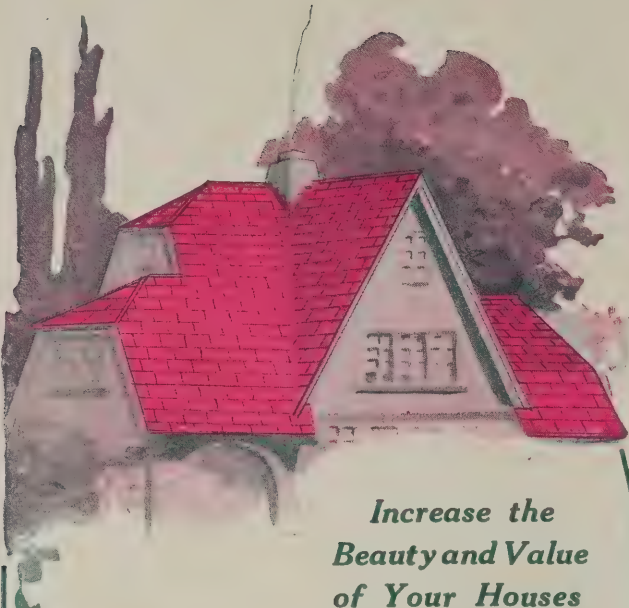
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Part of a row of 24 brick cottages erected by Tissier Bros. at East St. Louis, Ill. These Cottages are all covered with Rex-tile Shingles

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Every shingle used on the twenty-four brick cottages illustrated above is fastened at the butt.

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The two inch turn under at the butt end is what does the trick.

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THE BUILDING AGE

NEW YORK, DECEMBER, 1913

LIBRARY BUILDING FOR INDUSTRIAL WORKERS

The Direct Object of This Library is to Provide Technical Books and Periodicals Which will Be of Practical Value to the Working Classes

IT is generally conceded by architects that much greater difficulty is encountered in the successful design of a small building irrespective of the purpose for which it is intended than to plan one where the consideration of area and expense have little bearing.

design is a free adaptation of the Ionic Order and by careful study the dignity of the design has, in no way been sacrificed by the comparative small size of the building, which while irregular in shape, has an extreme width of 57 ft. 6 in. and an extreme depth of



Library Building for Industrial Workers—Lawrence V. Boyd, Architect, Philadelphia, Pa.

Particularly is this true in the treatment of what might be termed a Public Building, such as the library here described and illustrated and known as the William B. Stephens Memorial Library. The direct object is to provide technical books and periodicals for reference purposes which will be of practical value to those employed in the numerous mills and industrial establishments in the district, the cost of many of the books being of a prohibitive nature to the general public.

As will be seen from the various illustrations the architect has evolved an exterior which is a revelation in its perfection of composition and detail. The general

55 ft., centrally located on a lot 148 ft. wide and 100 ft. in depth.

For the general construction of the building, Indiana limestone was chosen, the base and steps being of granite. The foundations were built of local stone, laid in cement and all the limestone was coated, back and sides with a damp-resisting paint, before being set. All exterior limestone is backed up with $4\frac{1}{2}$ in. of brick work laid in lime mortar.

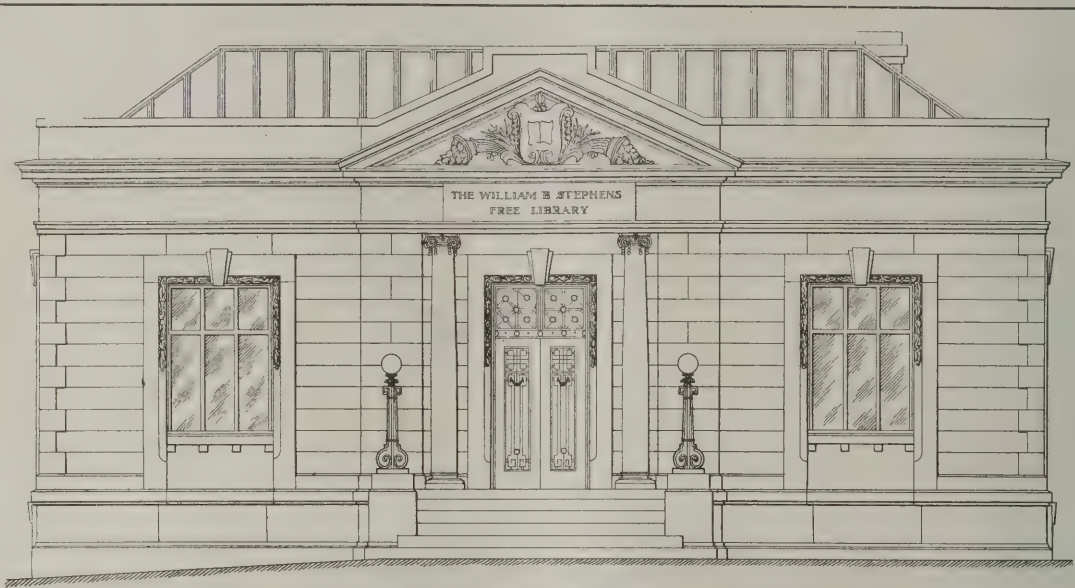
The carving in the stone work was all hand cut from plaster models. Specially constructed metal window frames were used, having a Verd-antique finish, the

green tone of which, together with that of the copper roof, the chased grille of the doors and the ornamental lamp posts, which mark the entrance, harmonize with the natural color of the stone and blend with the shrubbery and grass surrounding the building.

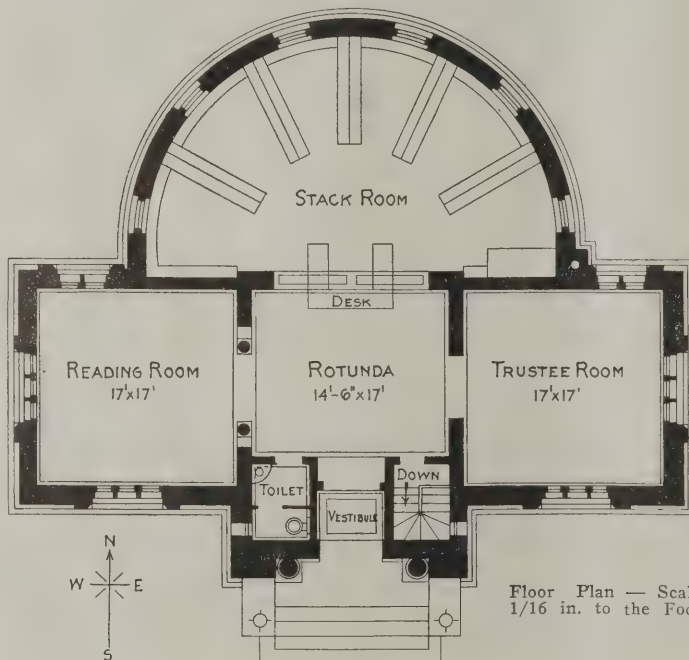
All joists are of hemlock and placed 16 in. on centers, and are bridged herringbone every 7 ft. with 2 x 3-in. hemlock. Joists are doubled under all partitions running the same way and the joists in the lavatory on the first floor are framed between to receive the tile floor.

All studs for interior frame partitions are 3 x 4-in.

The interior of the building shows a plan well adapted for its particular purpose. Facing the entrance is a spacious rotunda, 14 ft. 6 in. by 17 ft., which communicates with the various rooms, comprising a reading room, trustees' room and library stack room. The treatment of the rotunda is in French Renaissance. There is a high wainscoting of white marble 1 in. in thickness, above which the walls will be decorated with Mural paintings. The ceiling is of ornamental plaster, while over the doors are carved wood panels bearing symbolic emblems in bold relief. One of these carved



Front Elevation of Library—Scale 3/32 in. to the Foot



Floor Plan — Scale 1/16 in. to the Foot



Elevation in Rotunda Looking Toward Front Entrance—Scale 1/8 in. to the Foot

Library Building for Industrial Workers—Elevation, Plan and Detail

hemlock placed 16 in. on centers, well trussed at all openings. The rafters for the roofs are of hemlock placed 16 in. on centers and the ceiling beams where possible form tie beams well spliced to the rafters. The ridge poles are of 2 in. hemlock and the valley rafters of 3-in. stock. All copper on the roofs is laid over Neponset double-ply roofing felt made by Bird & Son, East Walpole, Mass., the felt in turn being laid on 7/8-in. hemlock sheathing boards.

All copper roofs are of 14 oz. soft copper laid with standing ribbed seams, ridge and hips.

examples is shown in the pictures presented herewith and represents the treatment of the spandrel over the doors of the vestibule. The entrances to the trustees' and reading rooms are through high arched doorways, the arches supported by imitation marble columns and pilasters. The trustees' room and the reading room are of the same dimensions, each being 17 ft. square.

Directly opposite the entrance is the stack room of the library. At the entrance from the rotunda is the librarian's desk, from which can be observed all portions of the stack room as well as the reading room.

The stack room is semi-circular in contour 20 ft. deep at the center and has a 17-ft. radius from a point 2 ft. 6 in. from the entrance. The stacks for reference

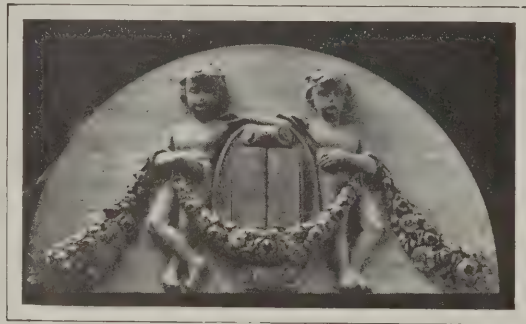


A Detail of the Main Entrance

risers to the height of several feet from the sidewalk, while a wide cement walk leads from the pavement to the steps of the building.

While the general work was done by William R. Dougherty, contractor, many of the various portions of the work were reserved and let under separate contracts.

The building is heated with a Kelsey Warm Air Generator made by the Kelsey Heating Company, Syracuse, N. Y. The heating pipes are of bright tin plate, covered with corrugated cellular asbestos covering. The heat flues are covered with plain asbestos and lathed over with herringbone metal lath. Fresh air is supplied the furnace by means of a galvanized iron duct connected with the air, through an opening in the outside wall. The usual plumbing connections



Wood Carving in Spandrel Over Vestibule Doors as Viewed from the Rotunda



A View from the Rotunda Looking Into the Reading Room Beyond and Showing the Stack Room at the Right

Library Building for Industrial Workers—Lawrence V. Boyd, Architect

books radiate from the librarian's desk and extend to the walls of the room. Windows provide light between each stack, while an overhead dome of structural steel with leaded glass provides ample daylight for general purposes.

A local stone retaining wall with a limestone cap

are made with the water supply and sewerage system.

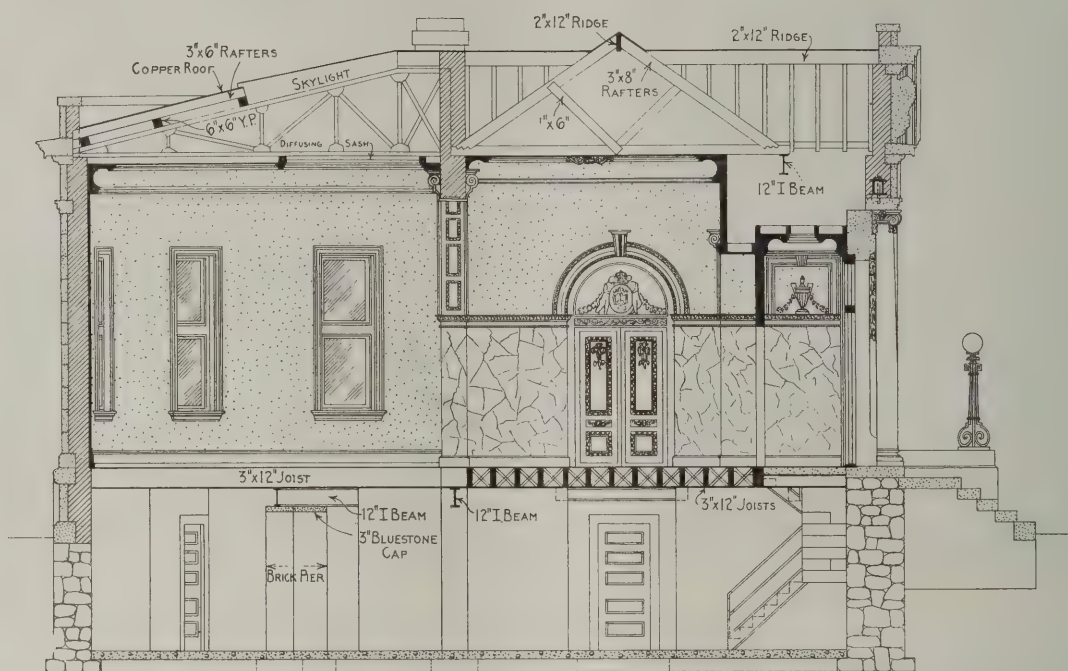
The cold water supply is obtained from the street main through a 1¼ in. galvanized iron pipe and with ¾-in. riser to toilet room, 1-in. branch to three sill-cocks, ½-in. branch to wash basins and water closet tanks, and a ¾-in. pipe to the sink. The water closets

are of Hydric pattern. The wash basin in the lavatory on the first floor is of enameled iron 20 x 20 in. in size, while that in the basement is 24 x 19 in. The sink in the boiler room is galvanized iron with back, 20 x 36 in. and supported on galvanized iron brackets.

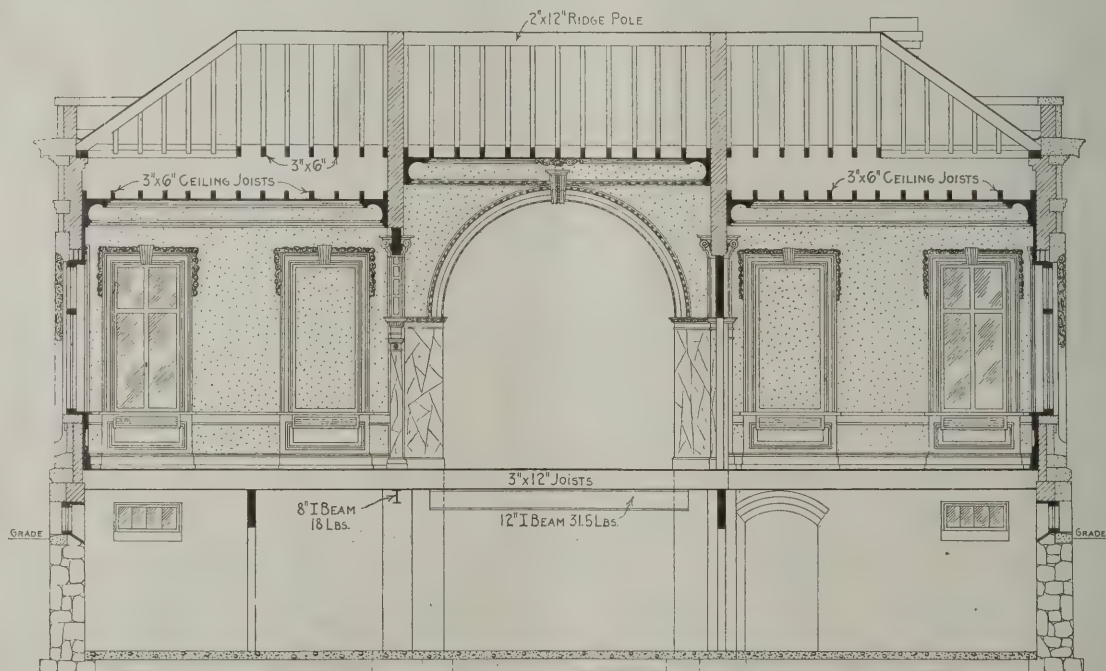
Soil pipes and rain conductors are all of heavy 4-in. cast iron pipe, the rain conductors extending to within

is located the toilet and washroom. At the left is the entrance to the cellar, which is reached by means of an iron staircase.

The floor of the cellar is cemented, the entire floor being first well rammed on which a 3-in. layer of cinder concrete well rammed is laid, on top of which a top coat 1 in. thick of cement and sand is laid. The



A Vertical Longitudinal Section Showing Various Details of Construction—Scale 3/32 In. to the Foot



Vertical Cross Section of the Building—Scale 3/32 In. to the Foot

Library Building for Industrial Workers—Various Elevations

one foot of the roof, where they are connected with copper conductors.

Gas pipes are run under the Rules and Regulations of the local gas company. A Perfection "C" gas water heater supplies hot water for use in the lavatory.

A Keller Duplex stationary vacuum cleaner outfit, located in the cellar of the building provides a vacuum cleaning system reaching to all parts of the interior of the building.

At the right of the entrance, opening on the rotunda,

first floor of the building is of the Monolith type, laid on a $\frac{7}{8}$ -in. No. 1 N. C. pine flooring, 3-in. face, laid on the joist, rough side up.

The interior woodwork of the first floor was let under separate contract. All the woodwork is of selected first quality white Indiana oak. The front and vestibule doors are 2 in. thick, while other doors are $1\frac{3}{4}$ in. thick, with flat panels and raised lip mold. In many instances carved scroll designs are used in connection with the door frames, particularly on the



Another View in the Rotunda Looking Directly Into the Stack Room and Showing the Reading Room at the Left



A View from Directly Behind the Librarian's Desk in Stack Room Looking Toward the Front Entrance of the Building
Library Building for Industrial Workers—Lawrence V. Boyd, Architect

rotunda side. Washboards are 40 in. high, including mold and sub-base.

All woodwork received one coat of paste filler, rubbed off, one coat of orange shellac and two coats of best inside rubbing varnish, varnish rubbed off between coats and final coat brought to a dull surface with pumice stone and oil.

The library building here shown was designed by Lawrence Visscher Boyd, architect, Harrison Building, Philadelphia, Pa., and erected on Krams Avenue above Baker Street, Manayunk, that city, on the site of the Stephens Mansion, with funds provided for that purpose by the late Caroline A. Stephens.

The Forest Products Exposition

At the headquarters of the Forest Products Exposition in Chicago, Ill., reports are being received from all sections of the country, including important Canadian points, indicating the liveliest interest in, and general support of the big undertaking. The prospectus, containing floor plans of the Coliseum, at Chicago, and of the Grand Central Palace, at New York, together with the rules and regulations governing the exhibition, are being distributed; also posters for display in the offices and plants of every branch of the wood industry, and "sticker-seals" for application to mail correspondence.

In the "foreword" of the prospectus is the significant statement, "the assurance is conveyed that the rules and regulations have been prepared with the welfare of the greatest number of exhibitors and the ultimate purpose of the Exposition in mind." evidently with the purpose of anticipating any individual objections to seemingly arbitrary restrictions or reservation of executive authority. To those familiar with the preparation and conduct of industrial expositions and general displays, this is a wise plan and provides a chart for the avoidance of future complications.

Manager George S. Wood is authority for the statement that the subsidiary organizations forming the National Lumber Manufacturers Association are proceeding enthusiastically and in careful deliberation with plans for their respective and joint displays, and many organizations and individual concerns are making preparations for more or less elaborate individual displays. This applies also to the affiliated products and by-products of the industry. Secretary J. E. Rhodes, of the National Lumber Manufacturers' Association and the Forest Products Exposition Company, recently returned from a trip through the Southeast and reported activity among the lumber and manufacturing interests in preparing for the Exposition.

Emphasis is being laid on the essential value and importance of an active display with actual demonstration as the keynote of the Exposition. This argument is based on the effective and lasting impression of showing not only the basic material and its various forms and developments, but the methods employed in production, describing eloquently the story of the wood industry from start to finish in efficiency, possibilities and permanency.

"The Forest Products Exposition is essentially the clearing house and shop window of the wood industry in all its phases and possibilities," said Manager Wood, "and in such relationship has no connection with or cognizance of any trade differences, controversies or complications. There is no politics, factional distinction, individual interest or special division to be considered. Entire freedom of action has been given the management with this policy fully authorized and endorsed, and any assumption to the contrary or indicated expression of the management or any controversial phase of the industry is unmerited."

Bungalows on Roofs of Store Buildings

Some time ago we briefly described in these columns a Bungalow which had been built on the top of an eight-story apartment house in Chicago and now we learn of a colony of Bungalows which has been built about a court on the roof of a block of one-story store buildings at Long Beach, Cal. The arrangement is such that from the street the construction looks like an ordinary brick business block with stores below and flats on the second floor, but the stairway from the street instead of leading to a second story lands one in a sunny court on the roof of the shops. Down the center of the court is a pergola with flower boxes beneath it and around the four sides are the low gables of 17 one-story Bungalows which in architecture remind one very much of Swiss chalets. In all there are 2 two-room, 4 three-room and 11 four-room Bungalow apartments about the court. The kitchens and dining rooms face the court and the living and sleeping rooms overlook the street.

There is a common laundry located on the roof of one of the Bungalows and clothes are hung out on the roofs of the kitchens unseen from the street below. Garbage is taken care of in boxes with ventilating pipes leading through the roof.

The floor of the court in question is covered with heavy canvas and drained by a gutter in the center.

The Building Age Index for 1913

The Index for the 1913 volume of *The Building Age* is now ready for distribution and it will be sent to any reader who makes application for it. Those whose names were sent us for the 1912 index will receive the index for 1913 without special request for it.

Meeting of the National Builders Supply Association

The members of the National Builders Supply Association will hold their annual convention February 17 and 18 with headquarters at the Hotel La Salle, Chicago, Ill. The first afternoon of the convention will be left open for a general visit to the Cement Show which will occur in the Coliseum at that time.

If the plans of the Board of Directors meet with the success now expected small dealers will be an important factor in the coming convention. As the dues of the Association have been reduced it is expected that this will be the means of bringing many dealers into the organization who heretofore have felt that they were not doing sufficient business to justify them in affiliating with the Supply Association.

New Horace Mann School Buildings

The contract for the new school building for boys to be erected at Broadway and 246th Street, New York City, for the Horace Mann School has been awarded to Charles T. Wills, Inc., 286 Fifth Avenue. The group of buildings will consist of a structure to accommodate 300 pupils, several additional class buildings and a faculty building. The cost is placed at \$200,000 and the architects are Edgar A. Josselyn, 3 West 29th Street, and Howells & Stokes, 100 William Street, New York City.

Balsam fir is said to make the best Christmas tree because of its regular form and beautiful dark green foliage. Spruce, hemlock, pine and the cedars are occasionally used, but none are considered equal to the fir.

A MOST UNUSUAL HOUSE MOVING OPERATION

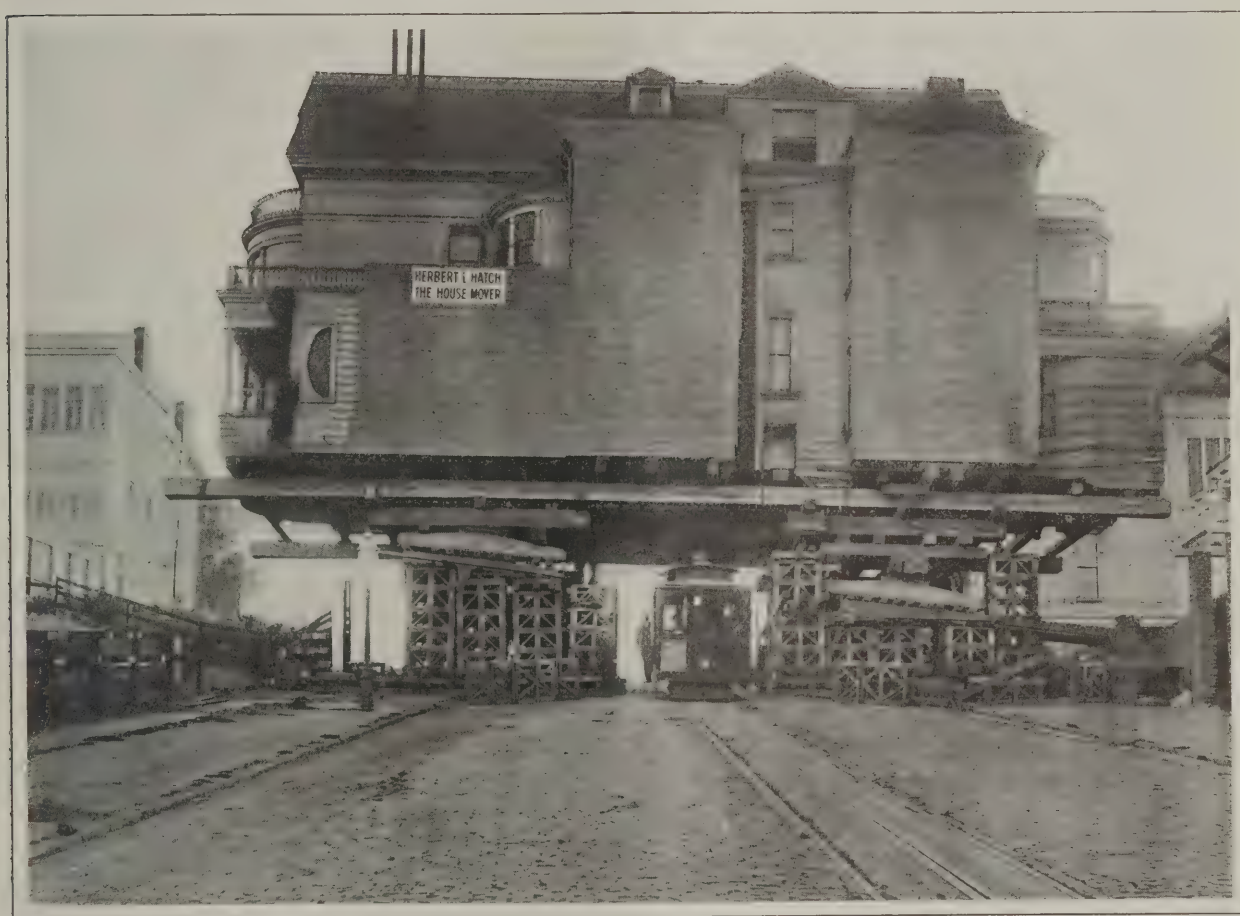
A Residence Weighing 300 Tons Moved Several Blocks Down a 25 Per Cent.

Grade—Necessary to Elevate the House on Crib Work High Enough to Enable Cable Cars to Pass Under Without Interruption

A few months ago we described in these columns a rather notable house moving operation in the city of San Francisco and which was regarded as the most important that had ever been undertaken on the Pacific Coast. In this issue we present particulars with photographic views of an undertaking which while not as massive is much more unique than the one above referred to. The very unusual feature of the house moving operation here described consists in the fact that it was necessary to elevate the building on crib work sufficiently high to enable cable cars and other traffic to readily pass beneath it without interrup-

ft. long and on top of these 10 x 10 in. subsills. Screws were then set under the main carrying timbers, known as "long shoes" and the building raised 12 ft. The track for the rollers was then laid on an 8 per cent. grade so that the building, when moved into the street was 16 ft. from the ground on the uphill side and 18½ ft. on the lower side.

There were 11 piles of house raising frames placed under each of the main carrying timbers, these frames being 4 ft. by 3 ft. by 20 in. and are shown under the building in the half tone engraving presented upon this page. Care was taken to have the first or lower frame



A Most Unusual House Moving Operation—View Showing the House Raised So That Street Traffic May Pass Underneath without Interruption

tion. Another decidedly unusual feature is found in the fact that although weighing something like 300 tons it was successfully moved down a 25 per cent. grade and placed upon its new foundations.

The building was moved from Washington Street near Octavia to a site on Washington Street between Gough and Franklin Streets in San Francisco. There was an 8 ft. basement under the building and all the carrying timbers were in place and "shimmed"—that is, wedged or keyed up so that all bearings came tight at once—before raising the structure.

First two sticks of Oregon pine 86 ft. long and 18 x 18 in. in cross section were placed under the building. Across these were placed 12 x 12 in. timbers 37

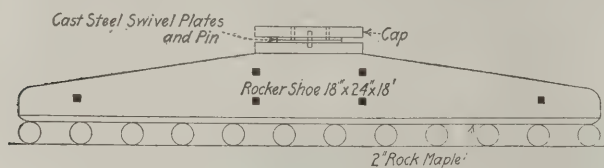
which rested on 3 x 8 in. bottom boards perfectly level. On top of each pile of frames two screws were placed in the manner as hereinafter described.

First a piece of 6 x 6 in. blocking 4 ft. long was placed on each of the side rails of the frame. Across these were placed four pieces of 6 x 6 in. material 3 ft. long, on which the flanges of the screws rested for the first setting. When the "set" was run out the screws were "fleeted" or re-set as follows, four men working on each side: One screw was taken out from each alternate pile of frames and replaced with a 12 in. screw block; then the other screw was taken out and set in the same way. After two sets had been run out it was necessary to put another frame on each pile.

This was done by putting a 6x8 in. timber lengthwise through the top frame and setting a 6x8 in. post on each end of it just outside the end rail of the frame and wedging it tight. The screws and blocking were



Another View of the House Showing Valley and Steep Hill Beyond



A Detail of One of the Roller-Shoes

then taken out and the frame slid in between the posts and set up as before.

The large half tone illustration shows the building loaded and ready to run down onto its foundations.

When starting its journey the building was pulled out into the street during the night between 12:30 A. M. and 5:00 A. M. and the timbers between the rocker shoes over which the rollers passed were removed so that the first car in the morning was not delayed. When running it in to occupy its new foundations this space was built in after the cars had stopped running at 1:00 A. M. and the building was moved across the track and all material gotten out of the way just 20 minutes before the first car passed at 5 o'clock.

The building was cross-loaded, that is, the rocker-shoes were placed cross-ways of the structure and lowered down the hill $1\frac{7}{8}$ in. to the foot for the first block and $2\frac{3}{8}$ in. to the foot for the second block. There were four independent tackles of 8 fold $4\frac{1}{2}$ manilla rope, making 32 parts in all.

One of the small half tone illustrations shows the house on the way down the hill, an idea of the steepness of which may be gathered from the view beyond. Another picture is a near view of a pile of blocking.

The building was lifted from its foundations with the ordinary house raising jack screws of which there were 44 in number. These screws are made of cast iron and have a lifting capacity of 10 tons each and raise 12 in. at each fleet. The screws have a square head and are turned with wrenches which have handles $4\frac{1}{2}$ ft. long. There were eight men employed and the building was raised $3\frac{1}{2}$ ft. each day.

The body of each rocker-shoe, an illustration of which is here shown, was made of Oregon pine 18 ft. long and 18x24 in. in cross section with a piece of 2 in. rock maple on the bottom. The rollers, of which there were 12 to each rocker-shoe, were of California laurel 8 in. in diameter and 4 ft. in length. The rocker-shoe cap was 4 x 24 in. in cross section, was made of eastern oak and was 40 in. long. This rested on two cast steel swivel plates with pin, the lower plate resting upon an oak piece the same size as the cap.

The work was carried to a successful conclusion by H. L. Hatch, 4439 Geary Street, San Francisco, Cal., who has established an enviable reputation as house-mover and riggin in that city.

City Ordinances Apply to Public Buildings

The importance of the decisions of the court of Pasadena, Cal., that the city plumbing regulations apply to public buildings and to the school buildings within a district under the jurisdiction of the State Board of Education is of wide interest. In this instance the building inspector and the plumbing inspector had visited the different cities of the United States and had conferred with different officials who are interested in school sanitation in conventions of different societies. In company with committees from these societies they had visited the school buildings in many of the large cities and were qualified to decide the character of the plumbing required by the city ordinances that should be installed in new buildings about to be erected. It is natural that the most modern plumbing adapted to the health and convenience of school children should show a marked advance over that which would be found in old school buildings, both in efficiency of service and in cost. More than a year ago the Board of Education of Pasadena started to build some new school buildings, and assumed that being under the jurisdiction of a state department it was superior to the regulations for plumbing in force in the city of Pasadena, and it acted independently, with the result that a civil suit was instituted. The matter has been in the courts for more than a year, but recently a decision has been handed down supporting the city officials in their contention, and the plumbing installations in the schools must be made to comply with the requirements of the city



A Close View of One of the Piles of Cribbing
A Most Unusual House Moving Operation

plumbing ordinances, exactly as those in privately owned buildings.

On account of the increased value of property in Buenos Aires, Argentina, says Consul General R. M. Bartleman of that place in a report to the Department of Commerce and Labor, it is no longer profitable to erect one-story structures, and in consequence eight to twelve-story buildings are now being erected. Large quantities of structural materials such as bars, roofing material, wood and hardware for interior finishings are used in the construction of these buildings.

ONE PHASE OF THE BUILDING PROBLEM

Bidding Upon Imperfectly Drawn Plans and Specifications—Means for Eliminating Discrepancies Between the Architect's Estimate and the Bids Submitted

By J. M. VOLLMER*



IN commenting upon the building problem there is one phase that seems to have entirely escaped notice or has been passed over for the reason that to rectify what is, without doubt, a serious drawback to the building industry, would entail a radical reform in a custom that has existed for a long time—a custom that has nothing to sustain its existence except a passive submission on the part of the contractor.

The phase to which I allude is that of bidding upon imperfectly drawn plans and specifications. The intent of plans is to show what is required and specifications should furnish a supplementary description of the work desired. This makes it imperative that all plans and specifications should be very plainly drawn and worded.

Statement of the Contractor's Position

By using the old expression that "the tailor cuts his garment according to the cloth" the building contractor's position is clearly stated with the possible exception of fine residence work, which is usually planned and built to suit the whim of the owner. With regard to building generally the paramount question is, "Will the investment pay?" Buildings for mercantile uses should be considered plants, whether intended for stores, offices or factory, and the cost of erection should not exceed the point where it will fail to produce a reasonable return on the money involved.

Here, in particular, is where the contractor resembles the tailor, as it is his duty to erect the structure according to the plans and specifications handed him by the owner and architect. This, in our opinion, is the greatest problem in contracting, for in almost every case the bids submitted exceed the original estimate made by the architect.

This condition is due entirely to the obsolete methods of preparing specifications and plans. Every branch of the building trade has advanced. Modern ideas and methods have supplanted old ideas and methods, new materials have been introduced and favored on account of their being more adaptable. Practically everything in building material is considered from the sanitary and fireproofing standpoint. In fact, progress has been made all along the line, save in the letting of work.

Old Methods of Bidding

The old method of out-guessing your competitor by bidding on vague plans and specifications is still in vogue. It would seem that in this day of enlightenment and mathematical precision that quantity and quality could be ascertained to the fraction of a penny and that the only difference to be found in bids upon a certain contract would be the percentage of profit expected by the competing contractors.

The opposite is the case, however, and the cause is directly traceable to the obscure manner in which the specifications and general conditions are prepared. The elimination of the doubt about material to be used by specifying in plain words the character and quality,

the exact method of their introduction into the building and furnishing all details instead of determining upon these important points after the contract is awarded would in a large measure prevent the custom of revision of the original plans in order to get the cost somewhere in the neighborhood of the owner's estimate. In other words, get the desired garment out of the cloth submitted.

Why So Much Work Is Postponed

Undoubtedly a large percentage of work is postponed indefinitely, and the reason, we believe, is that the bids offered were greater than the amount of money destined to be placed in the structure. Here is the problem and the result can easily be found by simply eliminating blanket clauses and obscure passages in the general conditions and specifications. We believe that by doing this we will not only find the cause of all building difficulties, but will insure a decrease in the cost of construction from 10 to 15 per cent.

The discrepancies between the architect's estimate and the bids submitted would disappear. Blanket clauses are used to cloak and protect. Their appearance in a contract is an admission of fault in the general conditions. Errors will crop out, as it is human to err, and where inaccuracies occur the parties directly responsible for them should bear the cost. In the case where the contractor is to blame, his bond will suffice to reimburse the owner. If the mistake is with the plans and specifications the loss should be at the expense of the owner or his agent.

By removing all question as to what is desired, the owner will be served better and the gambling aspect which has so long attached itself to contracting will be removed, and building for investment will become more profitable.

Death of Ashmead Gray Rodgers

The many friends in the trade of Ashmead Gray Rodgers, who for the past 12 years has been superintendent of the plant at Niagara Falls of the Carborundum Company, will regret to learn of his death which occurred October 23 as the result of injuries sustained through an accident on October 5. Mr. Rodgers was born in Albany, N. Y., in 1872, and previous to his connection with the company in question was superintendent of the Eddy Electrical Company, at Hartford, Conn. Mr. Rodgers had a host of friends and acquaintances throughout the mechanical and chemical world and they will sincerely feel the loss of a man who was so pleasing in personality, democratic in his attitude to others and so capable in his chosen line of work. He was a member of the American Chemical Society, the Engineers Society of New York, the Chemist, the Niagara, University and Country Clubs of Niagara Falls, and of other scientific and social organizations.

The funeral services were held Saturday, October 25, at Niagara Falls and were attended by several hundred employees of the Carborundum Company.

During the nine years ending 1912, Winnipeg, Canada, expended \$107,398,425 for 34,572 new buildings.

*Secretary, The Builders' Exchange of Louisville, Ky.

A COUNTRY HOUSE OF BRICK WITH TILE ROOF

Description, Plans and Details of a Residence Which is So Compact in Arrangement as to Resemble a City Apartment

AN office room is a desirable feature in any residence, even though the head of the household accomplishes no remunerative work within its walls. The well-ordered household should, if possible, be provided with a place in which letters may be written without fear of interruption, where books can be consulted and records kept, and where the mother of the family can go to make her plans and attend to the many little business details which are as much a part of the business of home-making as they are of the commercial enterprises, which all exist for the making of the home. For the country physician, the farmer or the writer, the home office room is a necessity.

The General Scheme of Design

In designing the house represented on the colored cover of this issue of *The Building Age* and which is here described, the idea has been to present a plan for a livable, compact, attractive home in which it would be practicable to have a spare room for an office. The location for this has been chosen at the left of the main entrance doorway, where a room is provided which is not connected with the other rooms of the dwelling, and which has plenty of light and air as well as a closet space.

The house is so designed that the rear chamber, bathroom and stairs to the second floor are not visible from the main hall.

That economy of labor in caring for this house has been considered is shown from the fact that the kitchen is so arranged as to have easy access to the dining room and porch through a good-sized pantry, the latter supplemented by a closet in the kitchen itself, which is within easy reach of the range and sink. The kitchen also has a set of wash trays.

All of the rooms in the house are provided with abundance of light and a cross draft, special provision being made for the latter on the second floor by the insertion of transoms over all doors.

The foundation walls are constructed of concrete 10 in. in thickness, resting on footings 10 in. high and 20 in. in width. All concrete is mixed in proportions of one part cement, three parts sand and five broken stone. The cellar floor is of concrete, 3 in. in thickness, and laid upon a base of cinders 6 in. in depth.

The Exterior Walls

The exterior walls of the building are of rough brick 8 in. in thickness, laid with an alternate header and stretcher in clear white mortar.

The chimney is lined with vitrified flue lining and trimmer arches are provided under all hearths. The arch in the kitchen is covered with 3 in. of concrete, finished with $\frac{1}{2}$ in. of cement and sand equally mixed. Cement steps are specified at the entrance to the cellar. The sills are constructed with a heading course of brick, the lintels, of a stretcher course of brick supported on steel angles.

With the exception of the cellar all parts of the building are finished with King's Windsor cement in two coats, including the white finish. The bathroom is of mosaic white tile and the side walls are covered with 4 x 4-in. white tile to a height of 3 ft. The porch and entry floors are of 6 x 6-in. dark red tile.

All timber is of spruce, and the principal framing members are of the following dimensions: First and

second tier joists, 2 x 8 in., 16 in. on centers; rafters, 2 x 6 in., 20 in. on centers; studding, 2 x 4 in., 16 in. on centers, the studs being doubled around doors and windows. All bearing partitions are bridged and have 4 x 4-in. plates top and bottom. Cross bridging is of 2 x 3-in. material, placed every 10 ft. Trimmers and headers are doubled, and those of the stairways are hung in stirrup irons, $\frac{1}{2}$ x 2 $\frac{1}{2}$ in. and let in flush with the top of the timbers. All exterior brick walls are furred on the interior with 1 $\frac{1}{2}$ x 2-in. strips set vertically 16 in. on centers and spiked to the brickwork.

The roof is covered with $\frac{7}{8}$ x 8-in. N. C. pine sheathing, on which is a heavy layer of carbonized roofing felt, and over this in turn is laid flat vitrified, red unglazed tile, the horizontal laps of which are bedded in elastic tile cement, colored to match the tile.

The rough flooring of the first story is of $\frac{7}{8}$ x 8-in. N. C. pine, laid diagonally, covered with a layer of soundproof deafening felt, upon which is laid a finished floor of $\frac{7}{8}$ x 2 $\frac{1}{2}$ -in. N. C. pine, tongued and grooved. The floor of the second story is single and of the same material as the finished floor of the first story.

The interior of the building is finished with cypress. All outside trim, doors, sash, etc., are painted three coats. The interior woodwork and trim is stained.

The hardware of the first floor is of verde antique finish and on the second floor of dull bronze finish.

The bath room plumbing equipment consists of a wash basin, bath tub and water closet, porcelain enameled, and with all exposed pipes of nickel-plated finish. The kitchen equipment consists of a glazed, brown, earthenware sink and two wash trays of the same material provided with metal covers, and a coal range connected with a 30-gal. galvanized boiler.

The house is piped for gas and wired for electricity, outlets being located in all rooms so arranged that combination gas and electric fixtures can be used.

Heat is furnished by a hot-water system with radiators located in all rooms except the kitchen and pantry.

Cost of Material and Labor

Following is a detailed estimate of the cost of material and labor above described, based on prices prevailing at the present writing within a radius of 35 miles of New York City:

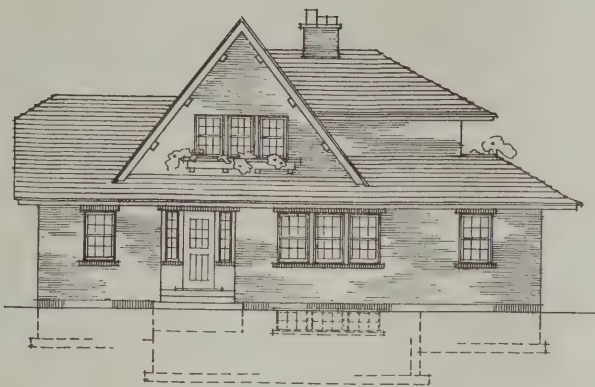
Excavating and grading.....	\$110.00
Masonry work, including concrete footings and foundation walls, brick exterior walls, chimney and fireplace, tile roof	3,000.00
Interior plastering.....	380.00
Carpentry work, including labor, trim, lumber, etc.....	1,420.00
Hardware	80.00
Metal work	110.00
Painting, including exterior and interior staining, painting, etc.	200.00
Plumbing, including hot water heating, gas fitting, etc.....	680.00
Electric wiring and bell work.....	70.00
Combination lighting fixtures.....	50.00
Total	\$6,100.00

These figures include contractor's 10 per cent. profit.

The cubical contents of the house is as follows: Size of house, including porches, 48 ft. x 26 ft. x (approximate height) 22 ft. equals 27,456 cu. ft.

Figuring the total cubical contents at a unit price of 20c. per cubic foot gives the approximate cost of \$5,491.20, which applies where shingles are used for the roof, instead of tile.

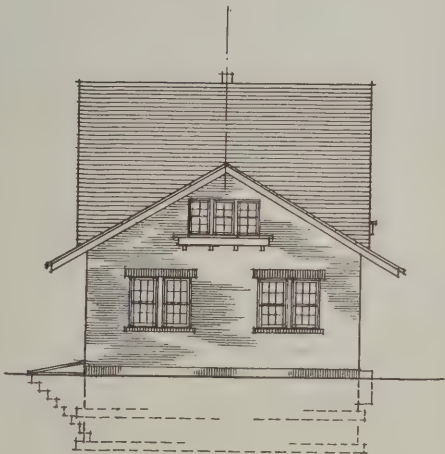
This house was designed and plans prepared by Mr. Arthur Weindorf, architect, care of *The Building Age*, or Long Island City, N. Y.



FRONT ELEVATION



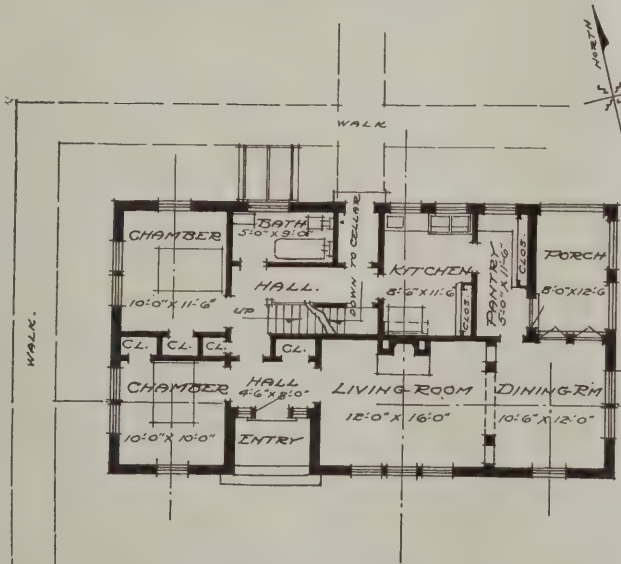
SIDE ELEVATION



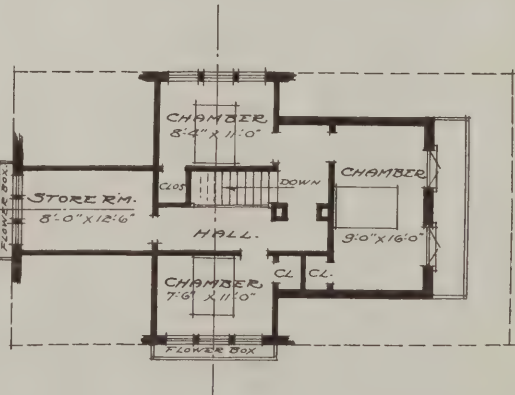
SIDE ELEVATION



REAR ELEVATION

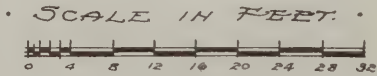


FIRST FLOOR PLAN



SECOND FLOOR PLAN

ARTHUR WEINDORT, ARCHT.
LONG ISLAND CITY, N. Y.





✧ VIEW IN LIVING ROOM ✧



DETAIL OF TRIM, DOORS AND WINDOWS IN DINING R'M.



SECTION THROUGH
CEILING BEAM.

DETAIL OF TRIM & DOORS IN HALL.

ARTHUR WEINDORF ARCHT.
LONG ISLAND CITY, N.Y.

SCALE FOR DETAILS
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OWNERSHIP OF PLANS AND SPECIFICATIONS

Architect's Right to Them—Necessity for Express Contract—When Custom Binds the Owner—Some English Cases Cited

By A. L. H. STREET



READER of *The Building Age* writing from a city in Wisconsin raises the following point touching ownership of plans: "A question came up not long since as to whether the clause in the regular specifications under the heading 'General Conditions,' where it states that 'the plans and specifications are the property of the architect and instruments of service, and as such shall be returned at the completion of the work,' would hold good, or whether the plans

and specifications were really the property of the owner who has paid for them."

The answer to the above question, based on the decisions of the courts of this country, as well as those of Canada and England, reviewed below, must be that the plans and specifications belong to the owner, unless it was agreed *when the architect was employed* that they should be retained by the latter, or unless the owner *at that time* knew of any custom entitling the architect to retain the instruments, and contracted with that custom in view. The architect's right must depend upon the terms of the contract under which he is employed, and not upon a clause in the specifications prepared in pursuance of that contract. The parties might, however, validly agree, during the performance of the work, that the plans and specifications should belong to the architect, though the contract of employment did not originally so provide, if the supplemental agreement is based on a new and valuable consideration.

When Drawings Remain the Property of the Architect

The Appellate Term of the New York Supreme Court held, in the case of *Hill vs. Sheffield*, 117 New York Supplement 99, that where an owner, being ignorant of the rule of the American Institute of Architects that "Drawings and specifications as instruments of service are the property of the architect," employed plaintiffs, a firm of architects, to prepare plans and specifications for the alteration of a building, plaintiffs could not recover for their services without delivering the drawings. The court said:

"While it may well be that, where both parties know this rule and make their contract in contemplation thereof, the drawings do really remain the property of the architect, and he can recover for his services, even though he refuses to deliver the drawings to his client, but in this case, where the client was shown at the trial never to have employed an architect before, and to have been ignorant of this rule, the drawings are his property under the contract by which he employed the architects, and they cannot recover for their services unless they deliver the drawings to him."

In another New York case, reported in full at page 887, volume 83 New York Supplement, the Appellate Division of the Supreme Court decided that by preparing plans and specifications, by receiving payment therefor from the owner, and by filing them with the City Building Department, an architect published the same, and had no further rights in them sufficient to entitle him to recover for subsequent use thereof in

the construction of another building by a third person; and that if plans are valuable as property after their publication, they belong to the client, and not to the architect. The court said in this case: "This would seem to be specially true where the plans and specifications have been used in the construction of a building and the building has been exposed to the gaze of the public, and has afforded the plaintiff the full value of his services."

When a City Owns the Drawings

In a Pennsylvania case, *Windrim vs. City of Philadelphia*, 9 Philadelphia Reports 550, the Court of Common Pleas of that city held that when plans were furnished the city for a municipal building and the architect received the premium offered for the accepted plan, the drawings became the property of the city, notwithstanding a contrary custom among architects. The presiding judge said: "It is true there seems to be a custom with architects to retain the plans in such cases, unless the architect whose plan is adopted is employed in the erection of the building. This may be a very good custom among architects as between each other, but it binds no one else." And in the case of *Tilley vs. County of Cook*, 103 United States Reports 155, wherein plaintiff sued for compensation in addition to a premium paid him for a plan for a public building submitted by him and accepted by the building authorities, it was held by the United States Supreme Court that he was not entitled to show a custom of architects, that when prizes were offered for plans for a building, the successful competitor remained the owner of his own designs, and that if they were adopted he was entitled to compensation therefor in addition to the prize, and that, by the same custom, the adoption of his plans entitled him to superintend the erection of the building, and to the usual remuneration therefor.

In a Canadian case, *Moffatt vs. Scott*, 8 Lower Canada Jurist 310, it was decided that plans for the construction of a church, though not annexed to the contract for the erection of the building, and not specifically stated to be a part thereof, formed a part of the contract, and as such to have become the property of the church organization, in the absence of proof that it was intended that they should belong to the architect. The court said:

Much Depends on Nature of Agreement

"Three architects have been examined for the purpose of proving that, according to general usage, the plans prepared for a building by an architect, are the property of the architect, and not of the proprietor of the building. This, however, I think must depend altogether on the nature of the agreement between the architect and the proprietor in each particular case; and I do not think that the testimony of the three witnesses to whom I have alluded, however good their standing in their profession may be, is sufficient to establish a usage binding on the community generally. It is doubtless true, as the witnesses have said, that an architect has an interest in retaining in his possession the plans which he has prepared. But the proprietor of a building has also an interest in being able to have at least free access to the plans according to which his

building has been erected—and, in the event of changes, or repairs, being made, reference to the original plans might almost be indispensable. Our attention has been drawn to the circumstance that the plans in the present case are not annexed to what is commonly called the contract, as the specifications are. This perhaps may be attributable to the inconvenience that would have resulted from attaching such a number of plans to the remainder of the contract. But, be this as it may, it is plain from the nature of the contract that the plans form as much a part of it as the specifications—I may add, that the architect being bound to the proprietors for the sufficiency of his plans, there is at least in some respects, the same objections against allowing an architect to have the exclusive possession of the plans that there would be against allowing contractors to have exclusive possession of the specifications, or against the proprietor of the building having exclusive possession of the contract binding him to pay the price of the work."

Ruling in an English Case

In an English case, *Gibbons vs. Pease*, 1 King's Bench Division (1905) 810, it appeared that an architect was employed by a building owner to carry out alterations in certain houses. He prepared plans and superintended the execution of the work, which was completed, and his agreed remuneration at an inclusive percentage on the outlay was paid. The owner then demanded the plans, which the architect refused to hand over. In a suit by the owner to recover possession of the plans, it was held that a custom set up by the architect entitling him to possession was unreasonable, and afforded no answer to the suit. The decision is fortified by an earlier decision in England to the effect that, under a contract to prepare plans for a vicarage, providing that the architect should receive 5 per cent on the outlay, if the work should be carried through, but only 2½ per cent on the estimated cost, if nothing should be done beyond preparation of the plans, the architect could not justify refusal to hand over the plans, on the owner offering to pay the 2½ per cent commission on determining not to proceed with the building, by showing a custom among architects to retain their plans when work is not proceeded with.

In the Gibbon case, one of the judges said: "If one considers the matter from the point of view of the reasonableness of the custom set up, the argument seems to me to be entirely in favor of the building owner. What would be his position after the building was completed? Unless he has the plans, how is he to know where the drains, the flues, and many other things are? Is he bound to go to the architect and make a fresh contract with him with respect to every matter that arises relating to the structure? Counsel for defendant were bound to admit that, if their view as to the retention of the plans is correct, there would be some sort of obligation on the architect for their safe custody; but that admission does not make the retention reasonable."

Plans Submitted in Prize Contest

The only other judicial authority on the question here discussed which has come to the attention of the writer is the decision of the Missouri Supreme Court in the case of *Walsh vs. St. Louis Exposition & Music Hall Association*, 14 Southwestern Reporter 722, wherein it was incidentally held that under a competition for prizes for plans instituted by the association, the association, on paying one of the prizes to a competing architect, became the owner of his plans.

There is a forestry school in the Philippines, where 28 men were graduated with the class of 1913.

Razing New York's First Skyscraper

About the time that this issue of the paper reaches the more distant subscribers' work will have been commenced upon the demolition of what was New York's first skyscraper—the Tower Building at 50 Broadway. It and the two smaller buildings adjoining are being torn down not so much to make room for a new structure, as to save in taxes as well as the expense of maintaining buildings which no longer pay for operating expenses. It is quite probable, however, that the vacant site thus created will in the course of time when the present supply of office space is somewhat exhausted, be utilized for a structure fully in keeping with the neighborhood.

The name "Tower Building" is to-day a misnomer, but when finished in 1889 it was the tallest structure in lower New York and was the first one ever put up of steel skeleton frame. In the corridor was a tablet placed there in 1899 by the Society of Architectural Iron Manufacturers of New York commemorating its erection as "the earliest example of the skeleton construction in which the entire weight of the walls and floors is borne and transmitted to the foundation by a frame work of metallic posts and beams."

The demolition of the Tower Building is a remarkable illustration of the wonderful advance in structural methods within a quarter of a century. When the architect, Bradford Lee Gilbert, who died in 1911, filed his plans on the 17th of April, 1888, there was nothing in the Building Code covering a structure of this kind and the officials of the Bureau of Building were much perplexed as to just what disposition to make of the matter. The Board of Examiners which had been created to pass upon such matters as were not covered by the code granted permission after much discussion and delay and the building was finished in the year 1889 as above intimated.

Its height of 129 ft. was greatly accentuated by the fact that its Broadway frontage was only a few inches over 21 ft. and in comparison with the 750 ft. Woolworth Building its height is insignificant. At the time, however, that the Tower Building was completed it was one of the points of curious interest for builders visiting the city from far and near.

An interesting story is told which strikingly illustrates the light in which the Tower Building was regarded by tenants in adjoining structures. A man who had an office next to the Tower Building told Mr. Gilbert, the architect, afterward, that he had moved away because he felt that the Tower Building would surely blow over in the first gale that swept over the island.

Changing Weathered Oak to Mahogany

The trim of a fine residence was oak which was to be treated with a weathered oak stain and rubbed to a dull finish. The furniture which was purchased for the house was mahogany and when installed the contrast was anything but pleasing to the young couple for whom the house had just been erected. The owner, therefore, decided to tear out the oak finishing, casings, doors, etc., and replace with birch. Just at this time, however, it occurred to one of the men employed by the painter having the contract for the work that much trouble might be saved by treating the woodwork to a mahogany oil stain. He, therefore, rubbed down a portion of the oak and applied the mahogany stain to it with such pleasing results that the entire woodwork was gone over, after sanding down, with mahogany stain and varnished.

The effect was a mahogany finish somewhat darker than usual, but nevertheless a very satisfactory job.

A BARN OF PLANK FRAME CONSTRUCTION

Details of Interest to the Practical Builder—Some Figures of Cost—
Pictures Showing Different Stages of the Work

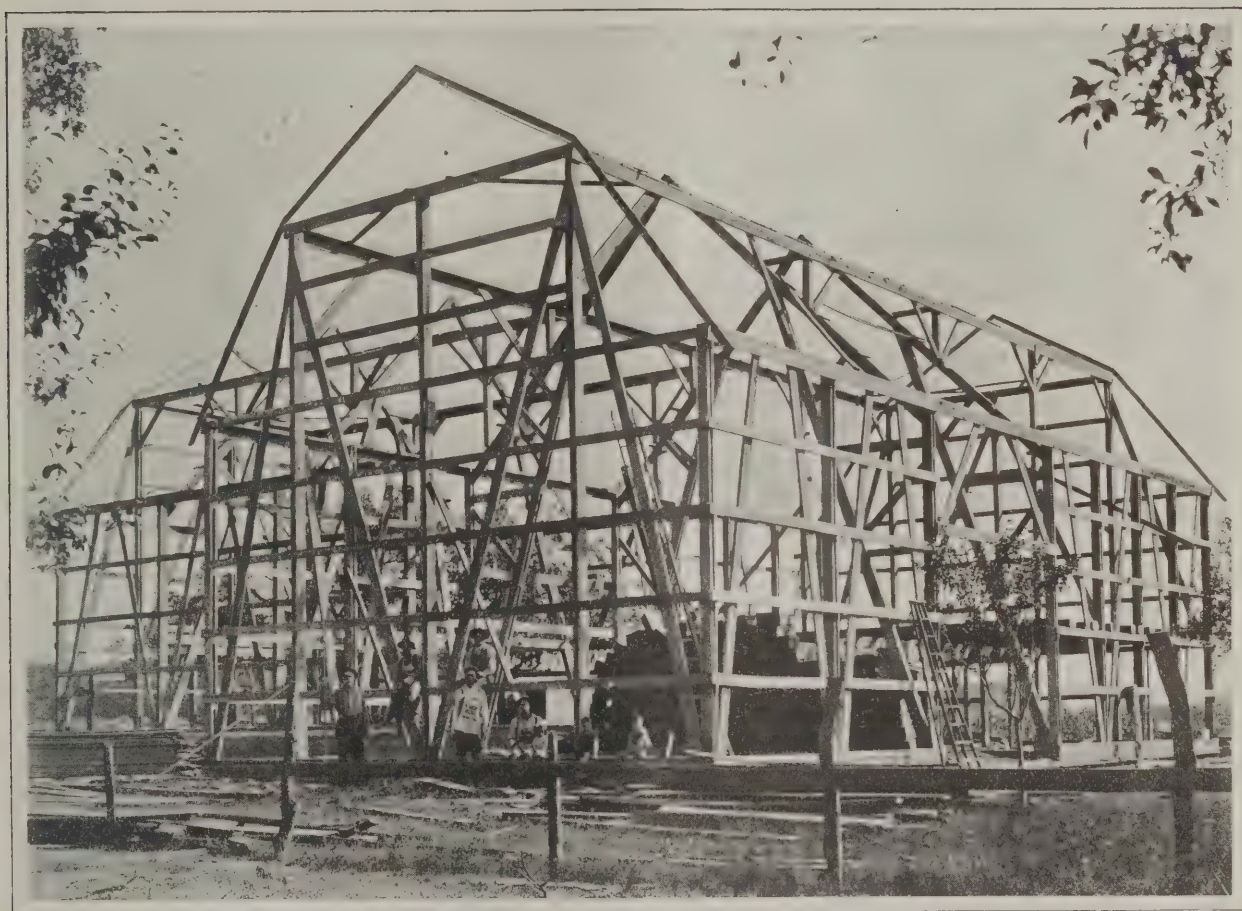
By JAMES F. HOBART

ONE of the most interesting farm structures which has ever come to the notice of the writer is the barn portrayed herewith and which has just been completed for Frank E. Hall, whose place is on the St. Jo Road about eight miles from Fort Wayne, Ind. The barn measures 36 x 70 ft. in plan, with a central north wing 36 x 40 ft. The vertical siding is 20 ft. high and the hip roof is 36 ft. from plate to peak. There were 53,000 shingles required to cover the roof and the cost of the siding and shingles together was \$519.50.

An excellent idea of the appearance of the barn as

in place 9 ft. from the ground and covers about 25 ft. of the entire end of the main building—a space to be used for horse and cattle stable, each kind having a side of the barn all to itself, but fed from a central passage between the two rows of stalls or stanchions.

The entire surface of the ground, under the roof, is to be concreted, except the main bay for hay storage, which covers about 26 x 36 ft., and forms a clear space for forage, from sill to ridge, over 50 ft. high. This mow alone has a capacity of more than 50 tons. The storage above the horse and cattle stable will con-



A Barn of Plank Frame Construction—Fig. 1—View of the Framework While in Process of Erection

viewed from the northwest corner while the framing was in progress is afforded by Fig. 1 of the engravings. Fig. 2 represents a plan view, while Fig. 3 shows the appearance of the completed structure. In Fig. 4 is presented a view of the frame work from the south side. High up in each gable of the barn is a hay window and between the two there has been arranged a system of hay slingers and carrier ropes by means of which hay or straw may be received at either end of the barn and deposited at any point inside the building.

The striking feature of the barn is the method of bracing, this being very clearly shown in Fig. 4, the inverted V in the middle of the end bent being reinforced by a half V on either side of the purlin posts in the end frame. It will also be noted that the bracing does not extend below the flooring, which has been put

tain at least 35 tons more fodder, while mow space in the wing contains rooms for 40 tons more.

The foundations of the building consist of good concrete, 18 in. wide and nearly 2 ft. deep, placed upon solid clay, well drained to carry away surface water.

The sills are 3 x 10-in. oak and elm, both these native woods being used in the frame. Nothing larger than 3 x 10 in. was used in the frame, and for the standing members nothing larger than 2 x 8 in. was used, much of the timbering being 2 x 6 in. A little, but only a very little 2 x 4 in. stuff was used in the building.

The sills are fastened to the concrete foundations by ½-in. anchor bolts spaced about 4 ft. apart. The bolts were set in the foundation, and after the concrete hardened, nuts were placed above the sills and screwed tight. The end shown by Fig. 4 consists of an inverted

V bracing together with a split V on either side of the purlin posts, which in turn are built up of two 2 x 8-in. planks and 2 in. distance pieces, ½-in bolts being placed through, level with each girt or beam.

The far end of the main building has a different, and, it is claimed, a much more efficient brace arrangement. This bracing is more clearly shown in Fig. 1 and is seen to be two A-shaped timberings—or, more exactly, inverted V's, as there is no cross piece in the middle, as in the letter A. But one of these brace systems is bolted to the top of each end purlin-post and to the bottom of the middle post. This makes a very strong and rigid form of bracing, which, when taken in connection with the even and frequent bolting to the girts, can only serve to make the barn frame almost indestructible by any ordinary wind.

The plates and girts are each and all through-bolted to the posts, also to the brace members, of which there are at least a pair in each bent on the sides of the building, and a single long brace in each space on the ends. The end spaces are much narrower than those on the sides, therefore the single brace in each space serves to stiffen the girts sufficiently.

Steps, or jogs, are built inward in the concrete foundation at all points where the posts and brace members intersect, and at these points the distance pieces between the post planks are elongated so as to project between and through both planks comprising the long brace members. The planks comprising these brace members are in single lengths from top to bottom. There is not a splice in one of these brace pieces. They were all specially sawn to order, being gotten out at a band mill nearly eight miles distant and wagon-teamed to the place where used.

All the remaining rough lumber, except the long braces above mentioned was sawn on the spot by a portable mill which was brought there for that purpose. This "home-made" rough lumber aggregated more than 23,000 ft., board measure, and it was all cut on the farm.

Aside from the 3 x 10-in. sills, nothing larger than 2 x 8-in stuff was used in the barn, save for the short one-story posts which were placed under the floor above the stable, and under a floor which covers the entire surface of the wing. These posts were rough 6 x 6-in. sticks. The floor timbers over the spaces named above were also larger than 2 x 8 in., as they were plain sticks slabbed on top and bottom sides only and laid flatwise, with all bark carefully removed. These timbers showed about 5-in. face where slabbed. But there was nothing larger than 2 x 8 in. put into the frame of the entire barn and more than 900 bolts were required to fasten the frame members together.

It is probable that the cost of finishing the work will run a little more than the estimated \$200, but even then the owner is to be congratulated upon having secured one of the finest barn buildings in Allen County, Indiana, and a very low figure, indeed, compared with the vast amount of room inside the new structure.

The cost of the structure, complete, appears to be about \$2,500, and it roughly divides as follows:

Siding and shingles.....	\$520
Sawmill bill, 23,000 ft. B.M.....	140
Cement.....	100
Labor on foundations.....	50
Erection of building.....	375
Iron—nails, bolts, spikes, track.....	131
Eave spouting and conductors.....	27
Lightning rods.....	40
Rough lumber, 23,000 feet, cut on farm.....	575
Rough lumber for braces, 30 ft. 0 in.....	50
Labor by owner and board of men.....	300
Painting, floor-concreting, grading yet to be done (estimated).....	200
Total	\$2,508

A little matter, typical of country life, took place about as soon as the roof had been completed and the hay sling tackle installed. In fact, the very first thing handled by the hay-tackle was a full-grown, upright piano, which was hoisted upon the scaffold floor above the stable, and a dance and supper was given in honor of the new building—a very nice party being present and all enjoying the occasion very much.

Neither Figs. 1 nor 4 show all the rafters in place—only the end rafters having been erected at the time the photos were made. But both pictures show the purlins, notched to receive the rafters, to which shingle strips 2½ in. wide were nailed and the shingles placed directly upon these strips, thus securing a very light and well-ventilated roof.

The wall-siding was made of matchboard placed vertically and well nailed to the six supports shown in Fig. 1. In addition to making the siding as close fitting as possible, means were also employed to make the entire barn "sparrow-proof," there being not a single opening where these pests could build their nests.

The stable portions for the horses, also the mangers, are built of well seasoned maple, so hard that nails could not be driven without the use of grease or soap. The hay mangers have narrow openings at the bottom, the entire length of the manger, through which dirt from the fodder

can fall to the concrete floor of the stable and not have to be dug out of the mangers, as is too often the case.

The horses and cattle will not be permitted to stand directly upon the concrete floor of the stable, as a flooring of hard, well seasoned maple will be provided to receive the bedding, which is thus raised from the concrete and from the manure drainage space.

The arrangement of the stable with a central feeding space and two runways for the animals was prompted by the fact that the owner has small children who would have much to do with the feeding and attending to the cattle and horses, and as there would be less danger to them from double passages for the animals, the stable was made as shown on the plan.

All the manure and stable sweepings are to be removed in wheelbarrows and deposited in the wing, which is fitted for manure making and the concrete floor is covered with compost making material to absorb the liquid portion of the manure.

The upper portion of the wing, above the manure storage and cattle run, is floored, as stated elsewhere, and is intended to be used as a threshing floor when one is required and for storage at other times.

This barn was erected for Frank E. Hall, St. Jo



A Barn of Plank Frame Construction—Fig. 2—Main Floor Plan

Road, Fort Wayne, Ind., Rural delivery Route 14. While Mr. Hall drew the ground plans for the structure, the elevations and framing plans were prepared by the erector, Tom McManner, of Auburn, Ind. Mr. McManner is one of the best known barn builders in Allen County, Indiana, and it is to his credit that this structure is apparently strong enough to resist any wind except one that could tear the entire building free from its anchor bolts in the solid concrete.

A Plea for Heavier Framing

Indifference to the insistent demands of common sense, regarding the use of dimension stuff in house building, causes great dissatisfaction, and very often expensive trouble. When you walk across the floors of new houses which are supposed to be honestly and

be employed to good effect on wide joists if spaced closely. On narrow stuff the truss effect is lost almost entirely, owing to the horizontal position; they cannot possibly have the rigidity which is so necessary. It is time and material lost to bridge narrow joists unless very close together.

There is a way, however, which is always available, and it beats all the bridging you may do—a foundation wall under the center of the joists. If no wall is built, across and under the center of a stretch of joists, place a good, heavy piece of timber, supported by three piers of concrete, being sure that every piece of timber has a firm bearing on this support, says E. H. Clark in a recent issue of *The Carpenter*. You will find that this plan, if carefully done, will be much more effective than bridging.

For second-floor joists,



Fig. 3—View of the Completed Barn

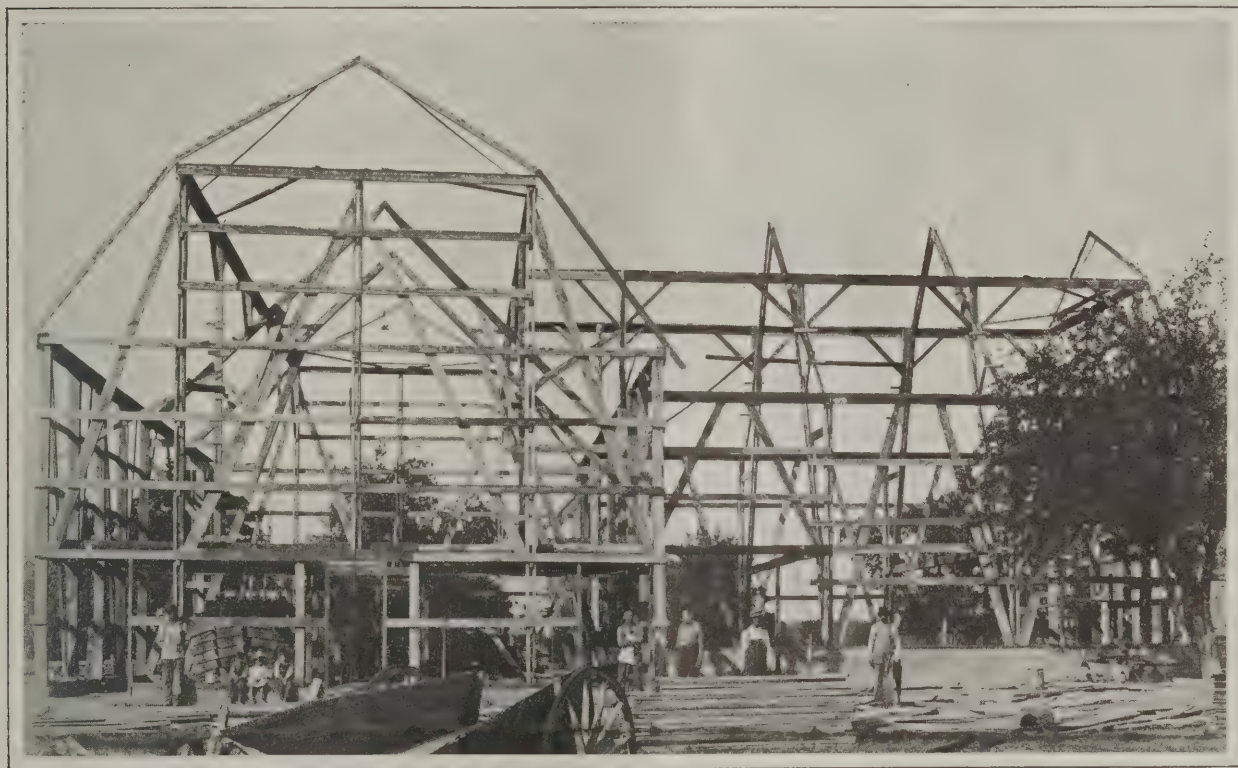


Fig. 4—The Frame in Course of Erection Viewed from One of the Gable Ends and Clearly Showing the Method of Bracing
A Barn of Plank Frame Construction

carefully constructed, don't you feel the vibration of the joists, the trembling of timber which causes a rattling of dishes or brick-a-brac on the tables and walls? Nothing is more annoying or aggravating, and nothing is more inexcusable on the part of the builder or owner, or both.

Then let us begin at the foundation. In most cases the joists are too light. Lower sleepers or joists should, by all means, be never less than 2 x 10, and 2 x 12 is better. The habit of using 2 x 8s is too common in foundation work. The heavier dimension should be used, and spaced not farther apart than 16 inches on centers. In case of short spans of 10, or the most 12 feet, 2 x 8s may be used if close enough to insure solidity. But this size joists should never be used on 16-foot spans, or above that. Bridging can

of course, no center supports can be placed across rooms, so they should be 2 x 10, which will admit of very effective trussing, being spaced on 16-in. centers.

The third set of joists (I am referring to a two-story house) if there is to be an attic room, should be 2 x 8.

It is very important to give sensible consideration to studs and rafters. If you are building a tall house, the only thing to use for studs is a 2 x 6. A 2 x 4 is too light for two-story houses, only measuring, in most cases, 3 $\frac{5}{8}$ inches. Studs of this dimension, braced in the manner described in a former article, have 100 per cent more wind resistance than the size usually used. The strength of these heavy studs is not impaired by cutting gains for joist-bearer, braces, etc., as is the case in lighter stuff.

All rafters (when an ordinary shingle roof is to be put on) over 12 feet should be made from 2 x 6s. Where a slate or tile roof is to be made, all lengths of straight, cripples and jacks should be not less than 2 x 6. The fragile 2 x 4 will sag to an alarming extent even under wooden shingles.

This is the day of quick work on dwellings. The question, when you begin the work, is, "How soon can I move in?" People are too prone to put up a frail job just for the speed it insures, and in order to get to another one. It is impossible to do good work and go in a trot. I do not wish to be understood as an extremist on this subject, nor do I wish to urge upon you the old-time barn frame for houses, but I do contend that the modern dwelling, as a rule, is constructed out of stuff that is too light and flimsy.

Of course, the wide-studding idea calls for deeper window and door frames, but you will be delighted with the pleasing appearance of the change, and we are all sure that it is more substantial in every way. Yes, it will cost a few more dollars to use heavier frame stuff, but you will have a job that will be free from shake in any direction, which is several hundred dollars better than a skimpy, limber and saggy one.

Hours of Labor and Wages in the English Building Trades

According to a recent English Board of Trade report there were 47,288 working people in the building trades who had their hours of labor changed in 1912 as compared with 6,150 in 1911 and 12,918 in 1910. Of these 46,403 had reductions amounting to 37,890 hours per week and 885 had their hours increased by 384 per week. The net result of all the changes was a reduction of 37,506 hours per week as compared with one of 3,658 in 1911 and 4,209 in 1910.

The principal reductions were those affecting 3,000 carpenters and joiners and 2,100 bricklayers at Manchester; 8,250 carpenters and joiners, bricklayers, masons, plasterers, wood-cutting machinists, plumbers, painters and laborers in Birmingham; 2,000 painters at Liverpool and 20,000 carpenters and joiners, and 3,500 masons in the city of London.

The wages of all classes of mechanics in the building trades showed an increase in 1912, the number affected being 95,653. The proportion of the total number employed in the building trades whose wages were changed in 1912 was a trifle more than 10½ per cent. The principal increases in wages during the year affected 2,111 carpenters and joiners, bricklayers, masons, plasterers, slaters and laborers at Hull; 1,350 painters at Newcastle, Sunderland and other northeast coast towns; 1,000 carpenters and joiners at Leeds; 5,850 bricklayers, carpenters and joiners, plumbers, and woodcutting machinists in Manchester and district; 5,930 bricklayers, slaters, painters, laborers, etc., at Birmingham; 2,855 bricklayers, masons, carpenters and joiners, plumbers, plasterers, painters, laborers, etc., at Bristol; 1,323 bricklayers, carpenters and joiners, plumbers, plasterers and laborers at Coventry; 1,048 bricklayers, masons, carpenters, plumbers, plasterers, painters and laborers at Northampton; 3,500 masons and 20,000 carpenters and joiners in London; 2,700 bricklayers, masons, carpenters and joiners, plumbers, plasterers, painters and laborers at Cardiff; 1,490 bricklayers, masons, carpenters and joiners, plasterers and laborers at Newport, Mon.; 1,140 masons, carpenters and joiners and slaters at Aberdeen; 1,040 bricklayers, masons, joiners, slaters and painters at Dundee; 3,225 masons, carpenters and joiners and painters at Edinburgh and Leith; and 6,490 joiners, slaters, plumbers and painters in Glasgow and district; all of whom received an increase of ½d. per hour.

In addition, 1,100 carpenters and joiners in Sunderland and district, 1,000 laborers at Bradford and Shipley, and 1,600 laborers at Dublin received ¼d. per hour; 2,000 painters at Liverpool received ¾d. per hour, and laborers numbering 2,000 at Liverpool and 2,500 in Manchester and district had their wages increased in both cases to 6d. or 6½d. per hour.

The changes affecting carpenters and joiners account for 45 per cent. of the total number involved and for 44 per cent. of the total weekly increase.

Do Not Over-Heat the Glue

It is a well-known fact that many woodworkers over-heat the glue they are using, thus causing a considerable depreciation of the quality and lessening the amount of work which a given quantity of glue may accomplish. Glue should never be heated to a higher temperature than 135 to 140 degrees, says a writer in *Wood Craft*. Never heat glue "boiling hot" if you wish to obtain the best results from it.

Glue may be easily heated by steam to 200 or even 205 degrees, and if a pressure steam-heated glue heater be used the temperature may be driven up as high as 250 degrees. Heating glue too hot, especially by steam heat, before the glue is entirely dissolved will surely cause lumps which will do a great deal of damage to the work as well as require considerable expensive labor to get rid of them.

Another thing in regard to glue: don't buy cheap glue for use in summer. Remember, the hotter the weather the better the quality of glue that is necessary. In the coldest days of winter it may be possible to use cheap glue; but if you can get along with a glue worth nine cents per pound in December, January and February, then you had better spend thirteen cents a pound for glue in July and August. As stated before, it is not policy to try to save money by using cheap glue in hot weather.

Cost of Skyscrapers

A careful record on the structural work of numerous first-class office buildings has been kept by F. W. Fitzpatrick, a consulting architect at Washington, D. C., and, according to *Building Management*, it has been found that a fair average of them is the following cubical cost. The figures are in cents per cubic foot of building:

The foundation cost.....	1¾
Steel framing.....	2½
Granite and all masonry.....	11 1/6
Cornice, roofs and skylights.....	¾
Fireproof floors.....	¾
Partitions (tile).....	¾
All plastering and stucco.....	1¾
Elevator fronts and all ornamental metal work.....	2
Marble work.....	3 1/6
Hardware.....	2/15
Joiner work.....	1 1/6
Glass.....	5/12
Painting and varnish.....	7/30
Electric wiring.....	2/3
Heating.....	1¾
Plumbing.....	½
Elevators.....	1
Stairs, scenic structural framing "making ends meet," lamp fixtures, etc. What might be called a fair amount for "contingencies" in such a building, including lesser items not mentioned here but grouped together.....	4 23/120
Architect's fee.....	2¾
Total.....	34 5/12

It is claimed that some of the eucalypts of Australia are taller than the California redwoods, hitherto considered the highest trees in the world.

Honolulu is putting up a four-story business building nearly 400 ft. in length which will cost \$1,000,000.

INTERESTING LITTLE CHATS WITH BIG BUILDERS

Close Attention to Details One of the Prime Factors to a Successful Career in the Building Business

TO be able to successfully superintend the construction of anything from a small residence, or garage, to a skyscraper, requires more than ordinary ability. This is especially true nowadays when specifications on all classes of structures are constantly changing.

The subject of this sketch is William Miller, Jr., president of the firm of William Miller & Son, Cincinnati, Ohio, which began business in 1868, under the name of Dittmann & Miller, the partners being respectively the grandfather and father of the present head of the firm. Before leaving school William Miller, Jr. was employed by the firm during vacation time, and to this early training he largely attributes his present day success.

In a recent conversation with a representative of *The Building Age*, Mr. Miller stated that close attention to details was a trait possessed by both the members of the original firm. This was instilled into the younger Miller's mind early in life, and in later years he has been shown the wisdom of the idea on many occasions. No bid, no matter how small, is ever submitted until all details are worked out. To use his own language, "We never use any shotgun practice in going after a job; we first figure on what the job will cost, without overlooking a single minor detail, then we train our artillery on the objective point." The records show that this method has been successful in a satisfactory number of instances. One of the principal ideas of the firm is to be able, at all times, to submit an intelligent bid, but this can only be done after every feature of the plans for the building has been carefully gone over and considered.

The firm has found it a good practice to sublet all work on any job except the carpentry part of it, which it handles itself. Before making up the bid to be submitted to the owners or architects, the specifications are divided into different classes and bids are invited from responsible firms. The common practice of many contractors, especially when they first commence business is to accept the lowest bid without paying much attention to details. Frequently many sub-contractors take on work when they are partly ignorant regarding many important points. Naturally this not only works as a hardship to the sub-contractor but it frequently causes a heavy loss to the general contractor who is responsible for the entire job. To eliminate trouble of this kind was the aim of the founders of William Miller & Son, and when sub-bids are asked for the new specifications are gotten up in an intelligent manner so as to be readily understood by anyone who cares to submit a bid.

As soon as the sub-bids are all in they are tabulated and carefully gone over and frequently, Mr. Miller states, it is not practicable to use the figures of the lowest bidder, as due regard must be taken of the fact that experience is necessary in handling work of different kinds. In this way the firm claims to have avoided many pitfalls. The fact that it has handled successfully so many public contracts is evidence of the wisdom in employing such a method.

The firm has probably handled more public work for the city of Cincinnati than any other one firm located in that municipality.

Along this line it is proper to state that in probably no city in the country are building specifications for public structures more stringent than they are in Cincinnati. It is to the firm's credit that it has been successful in obtaining contracts for police stations, and other public work, through two generations, and from different political party office holders. At the present time it has considerable work under way for the city; its latest job being a large underground public comfort station, which shows the range of work handled.

In 1908 William Miller, Sr., died, leaving the business in the hands of his son, who has successfully conducted it since that time.

The son is some "joiner." He belongs to so many clubs and associations that he has to keep a card system record of them. He is a prominent Mason, an Elk and a member of the celebrated Laughery Country Club. He is a director of the United Banking & Savings Company, the National Building Association—a local building and loan association—the Building Construction & Employ-

ers' Association, the Master Carpenters' Exchange, the North Cincinnati Employment Association, a member of the Cincinnati Builders & Traders' Exchange and of the North Cincinnati Turn Verein Association. In practically all of these associations he holds some important office.

Mr. Miller has never taken any prominent part in politics, except to combat woman's suffrage, although it is stated that he comes out "second best" at home, where he is opposed by a wife and two young daughters, whose ideas on the question were obtained from their mother's side of the house.

Perhaps it would not be unfair to Mr. Miller to quote, without his knowledge of the interview, the opinion of one of Cincinnati's leading architects as to the class of work he does and his method of handling it.

"One of the principal reasons, I believe, that is responsible for the success of Wm. Miller & Son is the fact that Mr. Miller goes over the specifications for any particular building very carefully to familiarize



William Miller, One of Cincinnati's Successful Contracting Builders

himself with all the details before submitting a bid. If there are any features that do not appear practicable the attention of the architect is at once directed to them, so that there will be a perfect understanding between all concerned. It frequently happens that there are seemingly minor details overlooked by the architect which the contractor's experience teaches him are of importance. By having a thorough understanding both with the architect and owner before submitting a bid, you can readily see that the general contractor saves himself a great deal of trouble after the building is commenced. Another thing is that this

firm has the reputation of sticking closely to specifications as to inside fittings, taking great care to furnish exactly the fittings specified and never substitute a cheaper article.

Another important matter that many general contractors sometimes intentionally overlook is the employment of skilled labor only where skilled workmen are required. This of course means a higher wage schedule, but I believe that Mr. Miller will inform you the plan is cheaper in the long run and it certainly saves both the architect and the contractor a great deal of trouble to have competent men on the job."

SOME REMARKS ON BUILDING ESTIMATES

An Experience Which Is Doubtless Shared by Many Building Contractors
—Labor and Material Liens—The Contractor's Guarantee

BY EDWARD J. KUEGEMAN



PLACING a building contract with the lowest bidder may seem to many a good stroke of business and a money saver. Many home builders can testify that on the contrary it has been a very costly experiment. Lot owners deciding to build, should first inform themselves on the building laws and the obligations they assume when letting a building contract to an irresponsible person. They would learn that if any labor remains unpaid, also building material used in the construction of the house, that labor and material liens will compel them to pay the same or their lot and house will be sold to satisfy the liens.

Position of the Builder

It makes no difference if the builder has already received the full sum for which he contracted to build the house—the owner must pay all unpaid labor and material bills. Common sense and good business judgment should prove to everyone that when an irresponsible builder or carpenter who works for wages offers to build a \$5,000 to \$6,000 home for \$1,500 less than a large successful building company will do the work, there is something wrong somewhere.

The irresponsible builder has nothing to lose and is always assured of good wages and a good profit. He can name almost any price to secure the job and put it so low that no responsible concern can compete. All he wants is the contract. He can soon get enough cash advanced to take care of his profit and wages.

If, before the house is completed, the lot owner finds that he has already paid out as much as the finished house was to cost him, the shoestring contractor explains that he made a mistake in estimating—forgot to figure the doors or the windows or an entire floor, etc.—that no one could build a house for that price and that he will do his best to complete it as cheaply as possible. If the owner turns it over to someone else, it would cost him still more money.

The Owner of the Lot

The lot owner has absolutely no recourse and protection for the builder has no financial responsibility and is practically judgment proof. Consequently, he is compelled to put up the necessary additional money to complete the job and the \$3,500 house costs \$6,000 and is perhaps a poor job at that.

The only way a builder can protect himself against these irresponsible contractors who explain their ability

to figure so low a price because of their having no overhead expenses, etc., is by demanding a "builders' bond." This would promptly eliminate this class of bidders, and if the bond is furnished, it will protect the home builder against liens of any kind and would guarantee him the fulfillment of the contract as per specifications for the stipulated price.

Importance of a Building Bond

It is therefore of the utmost importance that everyone who desires to erect a building of any kind on a lot owned by himself, that he demand a building bond from any contractor of whose financial standing he is not absolutely sure.

It is not so much a question, Who will make the lowest bid? But what is the real value the finished house will represent? What is the workmanship and material that is going into it? Will the house be delivered for the contract price?

When a responsible builder agrees to erect any kind of a building for a certain price and according to certain specifications, he must do just as he has agreed, for he cannot only be forced to deliver the house as per contract, but he has a reputation to sustain.

He realizes that thoroughly satisfied customers are his best assets and a lasting advertisement. The irresponsible builder is simply after regular wages and a little profit and does not worry if he gets into trouble on a job, for as soon as he leaves it, his identity is lost, and if he cannot get another job to figure on for a while, he will work for some responsible building contractor until he can get in on another on the same basis.

Administration of Manhattan Bureau of Buildings Endorsed

At a meeting of architects, builders and engineers held in New York City on October 31 resolutions endorsing present methods of administration in the Manhattan Bureau of Buildings were adopted, while resolutions previously adopted by the New York Chapter of the American Institute of Architects, the New York Society of Architects, the Building Trades Employers' Association and the Consulting Engineers, were ratified. C. Grant Lafarge presided and addresses were made by Lewis Harding for the Building Trades Employers' Association, by A. L. Libman for the Consolidated Building Trades Association, by Robert D. Kohn for the New York Chapter of the American Institute of Architects, and by Oscar Lowinson for the New York Society of Architects.

MODERN HOUSE OF THE EARLY AMERICAN TYPE

An Example of Present-Day Architecture Embodying Many of the Features Which Characterized the Dwellings of Revolutionary Days

HE who has stood at the front portal of an old Colonial mansion and looked down the long hall at the picture of terraced garden and apple orchard, framed in the white enamel trim of the rear doorway, feels as if the architect who selects the Colonial model for the design of his dwelling should seek to embody this feature intact. It must be remembered, however, that many of the houses of Revolutionary days were provided with a kitchen in an outbuilding by itself, a fact which greatly simplified the problem of designing on the first floor. In the present instance, the central hallway feature has been retained, but, instead of extending through to the rear wall, it stops short to permit of the construction of a butler's pantry connecting kitchen and dining room.

The reception room at the left of the hallway is provided with a fireplace equipped with a gas log and is connected with the hall by a wide portal with columns

the cellar walls is plastered with Portland cement, while the outside is broom-dashed above grade.

All brick work is of Jersey brick laid in mortar made of two parts Portland cement, one part lime and two parts sharp sand. The brick work, where exposed on the outside for chimney stop, is of selected clinker brick laid in black mortar. All smoke flues are provided with fire clay pipe, and, in the case of furnace and kitchen flues, with fire clay thimbles. That portion of the chimney which is visible in the kitchen including the hearth, is composed of white enamel brick laid in cement mortar. The chimney caps are of selected blue stone 4 in. in thickness, with rock face edges. Eight $3\frac{1}{2}$ -in. girder columns are placed in the cellar, supported on $8 \times 8 \times 3$ in. blue stone footings.

The cellar floor is of concrete, composed of one part Portland cement and three parts gravel, with a finish coat composed of one part Portland cement and two



A Modern House of the Early American Type—Christôpher Myers, Architect, Montclair, N. J.

and a grill above. The library and the dining room are both about 15 ft. square and both are well lighted. A large fireplace is a feature of the library, as are also the built-in bookcases on each side of the portal leading to the dining room. Sliding doors separate the library from the hall, and another door at the left of the fireplace leads to the large piazza at the right side of the house. A large bay-window with a box seat is an artistic detail of the dining room.

Excavation for the cellar extends to a point 3 ft. 6 in. below grade, the cellar being 7 ft. 6 in. in the clear. All footing courses are of concrete 6 in. wider each way than the walls resting thereon, 8 in. in depth, and composed of one part Portland cement to three parts sharp screened gravel. The cellar walls and piers for porch columns are built of concrete 12 in. in thickness and composed of one part Portland cement, one part sand and 4 parts coarse gravel. The inner surface of

parts sharp sand, the first coat being 3 in. and the second one-half inch thick.

The mantel in the library is built of Roman brick and is 5 ft. in height. The fireplace is lined with fire-brick and equipped with a Covert iron fireplace throat and damper, and a Jackson ash tray, 9×15 in. in size.

The framing limber is of hemlock, the first and second floor joists being 2×10 in. placed 12 in. on centers; the third floor joists are also 2×10 in., but placed 16 in. on centers; the ceiling joists and collar beams, as well as the porch and piazza collar beams, are 2×6 in.; the rafters are 2×6 in., and the studs are 2×4 in., all placed 16 in. on centers.

The girders are 8×10 in.; the purlin plates 3×6 in.; the wall plates and sills are 3×8 in., the latter being laid flat, and the posts are 4×6 in. The studs are doubled at all door and window openings.

All floor joists and studs of partitions and outside

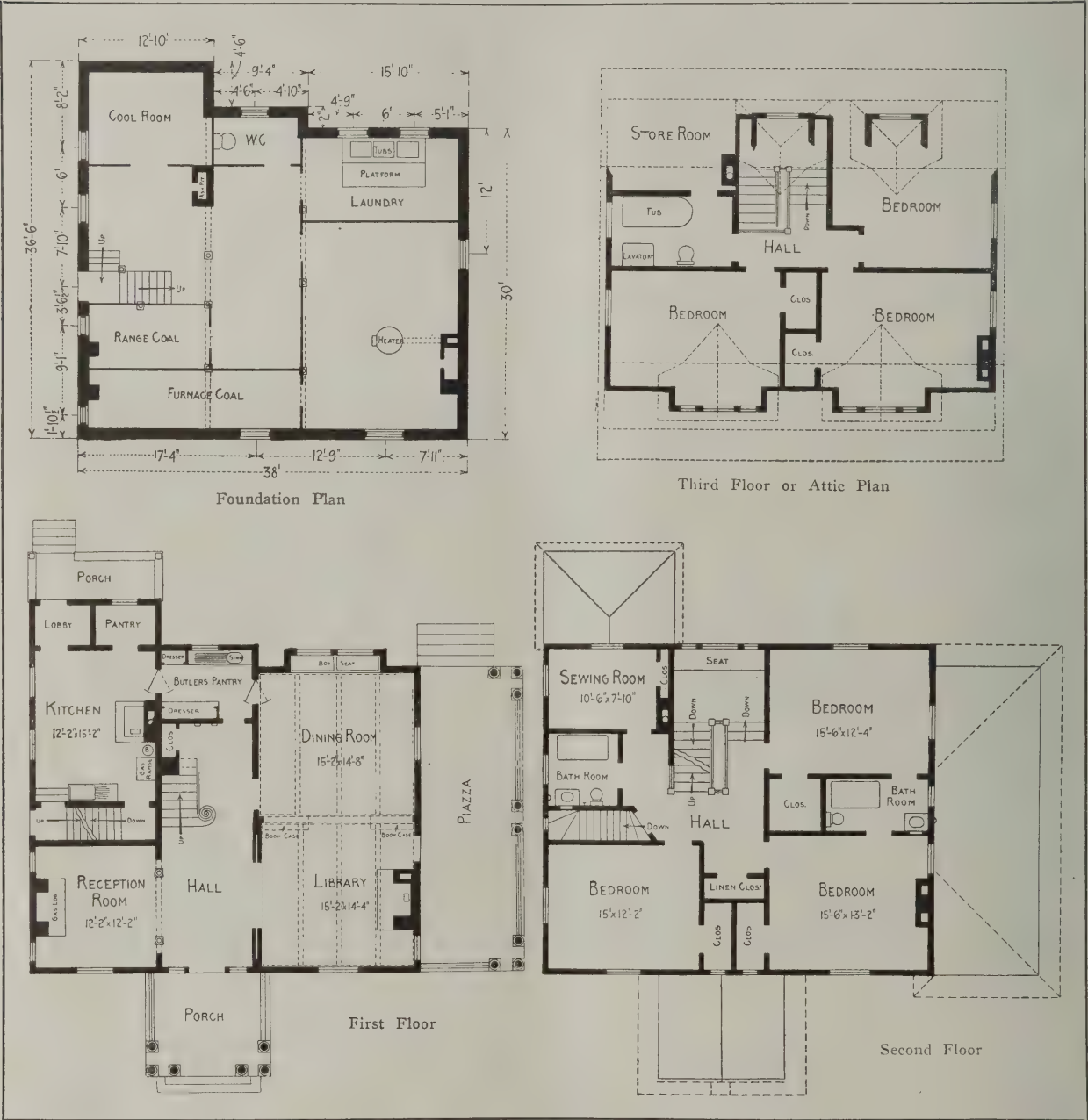
walls are cross-bridged with 2 x 4-in. stock and every partition and outside wall has a 2 x 4-in cut-in fire stop. The partitions are capped with 4 x 4-in. plates. The joists are doubled under all stud partitions, and all door, window and other openings are trussed over the top.

The exterior walls are covered with 7/8-in. hemlock sheathing boards put on horizontally, over which is a layer of red rosin sized building paper. All the exterior finish is white pine. The ceiling of the porch is of 7/8 x 2 1/2-in beaded N. C. pine.

The roofs are covered with 18-in Perfection red

grain Georgia pine. The first and second story have a sub-floor of hemlock laid diagonally, with sheathing paper between this and the finished floor. The porch floors are of white pine 1 1/4 x 2 1/2 in., laid in thick white lead. The balcony floor is of white pine strips 1 1/4 x 2 1/2 in., laid 1/8 in. apart, and the edges painted before laying.

All doors are of material to match the trim of the room. The hall side of doors is veneered with white wood. Those facing the library and the dining room are veneered with chestnut. The front door is veneered on both sides with birch, for painting. Doors



A Modern House of Early American Type—Floor Plans—Scale 1/16 In. to the Foot

cedar shingles laid on 1 x 2-in. spruce shingle lath and exposed 5 1/2 in. to the weather.

The walls and ceilings of all rooms are plastered with two coats of Windsor cement wall plaster. Kitchen pantries and closets have an additional coat of white hard finish, composed of hard-finish lime and plaster, put on as a finishing coat.

The floors of the lower hall, dining room, library, reception room and stair platform are of 7/8 x 2-in. quartered white oak. The balance of the first story and entire third floor are of 7/8 x 2 1/2-in. North Carolina pine. The entire second story is of 7/8 x 2 1/2-in. comb

in rear of house and on third floor are of Georgia pine; second floor of white pine. The blinds for the windows are of white pine. The trim of the library and dining room is chestnut, while that of the rear of the house, as well as the third floor, is North Carolina pine. The remainder of the first floor and second floor is white wood for painting.

The staircase from first to second floor is of quartered white oak, with stringers and risers of white pine; that from the second to the third floor, Georgia pine; back stairs, Georgia pine.

The dining room is provided with a heavy molded

plate rail, and beam ceilings are used in library and dining room. The mantel shelf for the library is of chestnut.

All exterior woodwork, including blinds, received three coats of paint, the last coat containing 15 per cent zinc. The tin work received two coats of metallic paint. Outside woodwork, including front and casement windows in library, is painted white; rear porch, rear door and cellar door are made to match the blinds; the lattice is green, the blinds dark green, the sash are white, the porch floors dark gray and the porch ceiling natural color.

All varnish stains and enamel for interior finish are of the Chicago Varnish Co. make. Woodwork of kitchen and third story received one coat of liquid filler and two coats of varnish. Walls and ceilings in kitchen and butler's pantry received one coat of size and two coats straw colored paint.

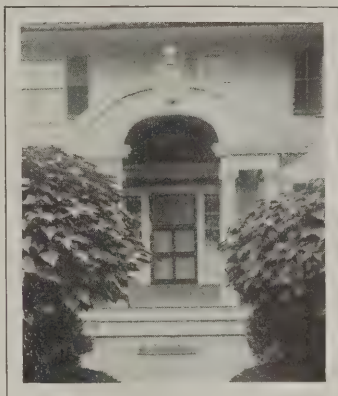
The panels between the beams of the dining room and library ceiling and the side walls of the library above the wainscot are calcimined. The kitchen floors received one coat of linseed oil and turpentine; the bath rooms on second and third floor one coat of size and three coats of paint, the last coat being stippled;

Varnish Co.'s "Enamelite" over paint; the second and third story floors one coat of liquid filler and two coats of "Supremis" floor varnish. All roofs are treated with one coat of moss green shingle stain.

The kitchen is equipped with a No. 68 Richardson & Boynton Perfect portable range, to which is connected a 52-gal. 5-ft. x 16-in. Quaker City galvanized hot-water boiler.

The heating plant consists of a No. 55A "Sunray" sectional steam boiler made by the U. S. Radiator Corp. and with a heating capacity equal to 550 ft. of radiation. The radiators are of the "Roman" pattern.

This residence was designed by Christopher Myers, architect, of Montclair, N. J., and erected under his supervision for J. A. Van Newkirk, at Montclair, N. J.



The Front Portal is Guarded by Two Catalpa Sentinels

Attractive Scaffolding

With a view to rendering more attractive the scaffoldings in front of buildings that are either in course of erection or undergoing alterations a firm of Philadelphia builders has evolved a scaffolding that is both useful and ornamental. The scaffolding is of the Italian



A Modern House of Early American Type—Hallway and Parlor as Seen from Living Room

the first story hall, the reception room and the stair balusters one coat of white shellac, three coats of paint and one coat of eggshell gloss enamel; the chestnut woodwork in the dining room and library one coat of stain, one coat of surface No. 20 and one coat of "Dead Lac"; the first story hardwood floors one coat of paste filler, one coat "Florsatin" and one coat of S. C. Johnson & Son's floor wax; all woodwork in the second story three coats of white paint; the woodwork of the bath room in the second story one coat of Chicago

pergola style with lattice effect and tastefully decorated in green and white. The arches at either end are approximately 10 ft. high with closely woven lattice work, beginning on both sides at a height of about 6 ft. from the pavement and graduating to a point of 9 ft. where there is a small platform on which are placed various colored plants and flowers. On the side facing the street the effect is similar and there is an arch at about the central point to permit people to alight from conveyances and enter the building.

Wood Top Floors

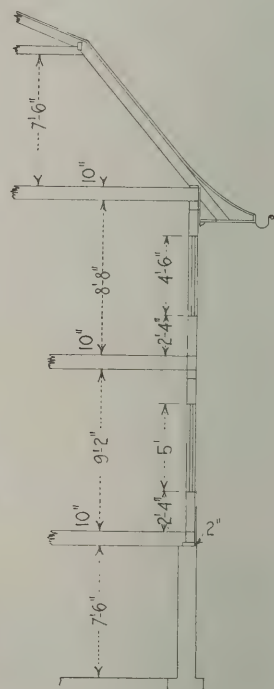
Where a hardwood floor is required over concrete slab, the common way is to lay beveled screeds about 12 inches or 15 inches on centers, bed these in cinder concrete, over them lay a one inch or two inch rough floor, and on top of this lay the hardwood, $\frac{7}{8}$ inch as

is much better square edged than tongued and grooved. Where square edged, if the floor boards warp, the edges do not split. If repairs are necessary, a board can be taken out without ruining the floor around it, and it will be found that the boards will wear better when square edged than when grooved.

The boarding should be laid the way of the greatest



Front Elevation—Scale $\frac{3}{32}$ In. to the Foot



Section Through Roof and Side Wall—Scale $\frac{3}{32}$ In. to the Foot



Side (Left) Elevation—Scale $\frac{3}{32}$ In. to the Foot

A Modern House of the Early American Type—Elevations and Section

a rule. The Aberthaw Construction Company, Boston, has laid an excellent hardwood floor by putting down $\frac{7}{8}$ inch form lumber on top of the rough concrete, laid diagonally to the finished floor and on top of this nailing the hardwood. This was done on a government job. However the boarding is to be laid, the hardwood

traffic, that is, trucking should not run at right angles to the floor boards if this can be avoided. Where the progress of traffic is definite it will pay to change the direction of the boarding where the turn in the traffic comes. For wet floors the Aberthaw Construction Company does not use maple, but considers Rift hard

pine, which is full of pitch, as very much better. There are preparations sold for preserving wood floors from the effect of wetting.

Table of Charges of French Architects

A table of charges to be asked for various kinds of work that French architects may be called upon to perform has recently been prepared by the Syndicated Chamber of French Architects. The charges made public are based on the amount of the bills when ordinary work is involved and on the net price when it relates to contract work, says Consul Carl Bailey Hurst, of Lyons. When old materials are employed, the difference between their value and that of new materials of the same kind will be added in estimating the charges.

All ordinary work will be charged for at the rate of 5 per cent on the total amount when such work reaches

ceding paragraphs, according to the classification that follows:

Appraising property, without inventory or plans, will be charged for at a minimum of 50 francs (\$9.65). Appraisements with inventories, calculations, etc., will be charged:

1. If a client has purchased property appraised for (a) the first 100,000 francs (\$19,300), 5 francs (\$0.965) per 1,000 francs (\$193); (b) for the second 100,000 francs, 4 francs (\$0.772) per 1,000 francs; (c) for the third 100,000 francs, 3 francs (\$0.579) per 1,000 francs; (d) for the fourth 100,000 francs, 2 francs (\$0.386) per 1,000 francs; (e) for the fifth 100,000 francs and above, 1 franc (\$0.193) per 1,000 francs.

2. If the appraised property has not been purchased by the client (a) for the first 200,000 francs (\$38,600), 2 francs (\$0.386) per thousand francs; (b) above 200,000 francs, 1 franc (\$0.193) per 1,000 francs.

The work outside of the town where the architect has



A Modern House of Early American Type—Living Room and Dining Room Merge Into One Spacious Apartment

1,000 francs (\$193) or above, but for work less than 21,000 francs (\$4,053) there will be added to the cost of the work a tenth of the difference between this amount and 21,000 francs. Work costing below 1,000 francs will be charged at the rate of 15 per cent, with a minimum of 10 francs (\$1.93). On work between 1,000 francs and 21,000 francs, must be added, in order to make the base for a given charge, one-tenth of the difference between, say, 1,000 francs taken as the cost of a piece of work, and 21,000 francs. One-tenth of the resulting 20,000 francs (\$3,860) or 2,000 francs (\$386) will be the amount to be added to the amount of the work on which to figure the percentage.

Charges for interior or exterior decoration work, for especially dangerous work, or for work requiring unusual study will be calculated according to the time devoted to the work in question. The minimum charge, however, will be 10 per cent. Charges for plans not carried out will be estimated along the lines of the pre-

his office fee will be paid at the rate of 50 francs (\$9.65) per half day and 100 francs (\$19.30) a day, provided the architect is not being paid for work already in progress.

The State College of Forestry at Syracuse, N. Y., had 47 counties of the state represented in its student body at the close of registration October 1. There were nine states outside of New York represented, and three Chinamen, who expect to return to China to practice forestry, registered in the first and second years.

What is said to be the largest apartment ever leased in New York City consists of 34 rooms, including eight bath rooms. It is in the structure now being erected on the former site of the clubhouse of the Freundschaft Society at the southeast corner of Park avenue and Seventy-second street.

HOISTING RIGS FOR THE BUILDERS' USE—III.

Conditions Under Which Various Forms of Hoisting Rig Can Be Used to Best Advantage—Details of Construction

By EDWARD H. CRUSSELL.*

IN continuing the subject it may be well for the writer to say, that in selecting a name for any appliance described in this work, he will choose that name which will be understood by the largest number of his readers.

Names and customs must necessarily vary in the different parts of a country as large as this, and the writer waives all claim to being an authority on the nomenclature of the devices discussed. If what are here called gin pole, pulley block, winch, etc., are known to the reader under other names, it is hoped that the foregoing will be taken into consideration and allowances made.

The gin pole is perhaps the best known and most used hoisting rig for emergency work, just as the boom derrick is more generally used on work of a more permanent or lasting character. They are closely related and both have their uses. As an illustration we might say that in erecting a modern steel frame building, where a considerable amount of material has to be

the top of the gin pole and the tackle is attached by means of a sling. The sling is prevented from slipping down the pole, either by nailing blocks below it, or by boring a hole through the pole and driving in an iron bolt or pin as shown in Fig. 18.

This drawing also shows the best method of fastening the guy lines to this temporary gin pole. Have two ropes, each long enough to make two guys, and attach the center of each of these ropes to the top of the pole by means of a clove hitch. The clove hitch is one of the best fastenings ever devised; because of there being no short kinks in it, it will stand more strain without injury to the rope than almost any other form of knot or hitch. It consists of two half hitches placed, one above the other in the order shown in the sketch and while it does not slip under load, neither will it jam and can be untied at any time as easily as it was tied.

In Fig. 19 is shown a simple set of iron work for the head of a gin pole of a more permanent kind. The



Fig. 18—Method of Attaching Tackle and Guy Lines to Temporary Gin Pole

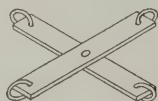


Fig. 19—Simple Set of Iron Work for Gin Pole

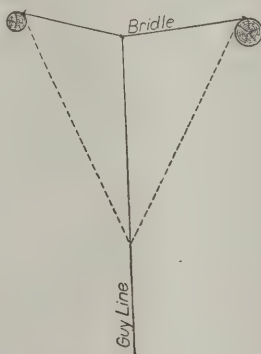


Fig. 20—Fastening Guy Line by Means of a Bridle



Fig. 21—Makeshift Anchorage for Guy Line

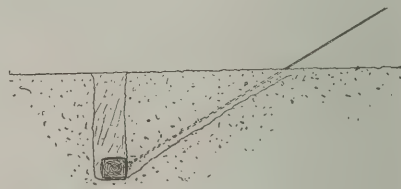


Fig. 22—Ground Anchor or "Dead Man"

Hoisting Rigs for the Builders' Use—III

handled and set up in a small area, the boom derrick is the proper rig to use. If, however, we were erecting a long, one-story building, such as is often used for manufacturing plants, and in which perhaps all the material to be hoisted is the roof trusses and roof beams, that is the place for the gin pole; its great advantage being the ease with which it can be moved to a new location for every panel of the roof.

The gin pole consists of a single upright, of a strength and height corresponding to the work that is to be handled. It is in most cases a stick of timber held erect by means of four guy lines but sometimes a steel pole takes the place of the wooden one and for heavy work the number of the guy lines are increased.

The length of the guy lines is usually figured at three times the height of the pole; it is sometimes necessary to use them of a shorter length and sometimes, in order to clear a thoroughfare or building, they must be made much longer. They require to be of heavier rope than that used in the tackle and wherever the conditions will warrant the expense, wire rope is the best to use for this purpose.

In a temporary rig, the guy lines are merely tied to

head of the pole is surrounded with a band of iron having a projecting lug. A link or ring, to which the upper block of the tackle may be hooked is fastened to the lug as shown. A stout iron pin with threaded end and nut to fit, is driven firmly into the end of the pole and projects above a sufficient distance to take the two straps which hold the guy lines. A small hole should be drilled through both nut and pin and after all the parts are assembled a cotter pin run through this hole to prevent the nut coming off.

The straps are plain pieces of bar iron, with a hole through their centers large enough to slip over the pin in the pole, and a ring at each end to which the guy lines are made fast. The upper ends of the guy lines may be spliced to the rings, and when the pole is taken down to be stored away, the straps are removed from the pole and coiled up with the guys.

The foot of the pole may rest directly on the ground, or on a block of wood especially provided. In the latter case, the pole should be fitted with an iron dowel that will enter a hole in the block of wood—or better yet, the lower end of the pole can be rounded off, and a hemispherical socket formed in the foot block for its reception. This will more easily allow of the pole being

*Copyright 1913, by Edward H. Crussell.

leaned from the perpendicular for the purpose of landing the load if at any time this should be necessary.

There is no danger of the foot of the pole kicking out while leaning in this manner, as the load exerts a downward thrust only; if it is leaned too far, however, there is a possibility of the foot sliding backwards, and, of course, it must be realized, the more the pole is leaned from the perpendicular, the more strain is thrown on the guy lines.

The lower ends of the guy lines must be firmly fastened to some secure or stationary object. Quite often they can be attached to a tree, a large boulder, or some projecting portion of a building. Sometimes, when the tree, or other anchorage, does not come in direct line, another rope is stretched between two of these points and the guy line is attached to it at whatever place will bring it into correct position.

This second rope is called a "bridle," it can often be made of service but care must be exercised in its adjustment. The nearer the bridle is to a straight line (as shown by the full lines in Fig. 20) the greater is the strain thrown upon it; it should be arranged as shown by the dotted lines and the smaller the angle between these two parts of the bridle the better.

There is another way of attaching a bridle which may in some cases prove more convenient. The guy line, instead of being fastened to the bridle is made fast

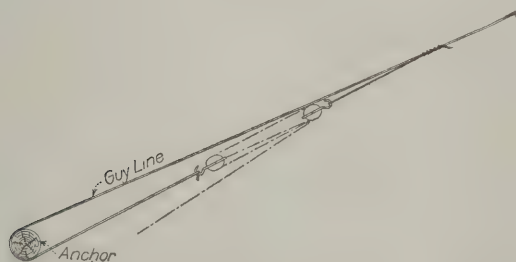


Fig. 23—Tightening Guy Lines with Block and Tackle

Hoisting Rigs for the Builders' Use—III

to one of the anchors. The bridle is then attached to the guy line and the other anchor and by means of it the guy line is warped over into place, sufficient slack being left in the guy line when fastening it to permit of this being done.

Where there is no natural anchorage for the guy lines, something must be provided. All kinds of makeshifts are devised and used for this purpose, and many accidents occur because of them. A common scheme is to fasten the guy line to a peg or pin driven into the ground. If stout iron or steel pins are used, and the ground is firm and the load light, the arrangement shown in Fig. 21 can sometimes be made to answer. Two pins are used for each guy line, they are fastened together with a chain, as shown. Sometimes the tail end of the guy line is used in lieu of the chain; being first fastened to the foot of the long pin, then stretched taut along the ground to the second one, and from there back to the top of the long pin. The clove hitch may be used at the foot of the pins and a round turn with two half hitches for the fastening at the top.

In work of importance, all these makeshift schemes should be avoided, and the ground anchor or "dead man" that is illustrated in Fig. 22, should be used in their stead. This is an anchor that can be arranged to resist any pull required. It consists of a stick of timber, from 6 x 6 to 12 x 12 inches in square section, and from five to twelve feet long, buried at such a depth (according to the nature of the ground) as will give the amount of resistance required. A round log may be used instead of the square stick and, indeed, is to be preferred; quite often the square stick is made round in the center of its length to afford greater ease in tightening the guy lines.

In placing the "dead man" a trench should be dug, long enough and wide enough to receive the stick of timber to be used, and of the depth decided upon.

At right angles with this trench in the center of its length, another trench is dug leading from the bottom of the first trench to the surface of the ground at the required angle. The guy lines are usually fastened by passing them around the stick of timber.

For a small pole the guys can be drawn taut by hand alone; for larger work they must be tightened with block and tackle. Fig. 23 shows one method. After the guy is taken around the anchorage the tackle is made fast to the end of it and to the standing part of the guy line. This method is perhaps the best for wire rope; for hemp rope the lower block of the tackle can be made fast to the anchorage with a sling and the end of the guy line left free for greater ease in fastening.

There are different methods of attaching the upper block of the tackle to the standing part of the guy line, one of which is illustrated in Fig. 24. This is known as a rolling hitch and is tied as follows: Hold the

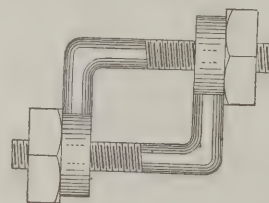


Fig. 25—Wire Rope Clip—Common Style

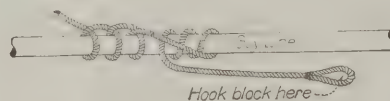


Fig. 24—The Rolling Hitch—One Method of Fastening Tackle to Guy Line

snub line against the guy line and take three round turns in the direction the guy line has to move, bring the end back and make three half hitches. A little study of Fig. 24 should make everything clear.

The rolling hitch is only of use in connection with hemp rope; where wire rope guys are used, the blocks can be attached with the help of wire rope clips, such as are illustrated in Fig. 25.

By means of these clips, another piece of wire rope can be attached to the guy, forming a bight into which the tackle can be hooked. Or the clip can be simply fixed to the guy, a piece of chain twisted around the guy behind it and the tackle hooked into the ends of the chain. When properly adjusted, a piece of chain will hold without the clip. Lay the center of the chain across the guy and twist the ends around it in opposite directions, so that they cross each other, until several turns have been made, then bring the ends of the chain together and hook the block of the tackle in both of them.

The reader will remember where, further back, we mentioned leaning the gin pole for the purpose of landing the load; he will realize that this means slacking off some of the guy lines and will think, that with the guy lines fastened as in Fig. 22, slacking them off will be rather difficult. In a case where the guy lines will require to be frequently slacked off and taken up again, instead of fastening the guy to the "dead man," use a long eye bolt, or a rope sling that will reach, at the correct angle, from the "dead man" to the surface of the ground and to this attach a single sheave block. Thread the end of the guy line through the block and make it fast to itself; it can now be slacked or tightened with the greatest ease. For permanent work the man-

ufacturers supply guy tighteners for fastening the guys to the anchorage; these tighteners are fitted with either a long thread and nut, or a turnbuckle and either with or without the sheave.

(To be continued)

Features of a Notable Hardware Installation

In connection with the structure recently completed at Omaha, known as the "Woodmen of the World Building," some features of the hardware installation are worthy of more than passing interest. Probably one of the most unique features of the entire work is the keying system.

The locks throughout the entire building are the same type of mortise lock selected to cut away the least possible amount of the door stile and the cylinders were so ordered that they were flush with the escutcheons without colors. The cylinders are all interchangeable.

Three individual keys were provided for each lock and a master key was provided for each floor which would open all the locks on that floor but on no other floor and no other lock in the building. A building manager's key was provided which when applied to any lock in the structure would throw the latch bolt on the inside of the office which in turn would lock out every other key to that door and no one could enter this office until the building manager with his key permitted.

In addition to this there was provided a grand master key, but it did not have the office usually covered by that term. This grand master key would not open any of the offices or tenants' quarters in the building, but it would open utility doors, such as closets, toilet rooms, employees' rooms, stairway doors, as well as those to the roof and attic and, in fact, all rooms except offices, shops, stores and supply rooms.

A key cabinet for keeping the keys contained two doors and a combination lock. On the back board of the cabinet was placed square brass hooks set in vertical and horizontal lines, and one hook provided for each door in the building, together with a row for miscellaneous keys and extra keys. No one but the manager or the assistant was permitted to give out keys, which were all made with special keyways, which could not be bought on the open market and could not be purchased from Sargent & Co., the hardware manufacturer, without a written order from the manager.

A rather clever arrangement was provided for the main lobby entrance doors which, while made to pass the grand master key, has an extra cylinder placed in the metal casing of the door frame which would pass all the keys in the building. This cylinder had an electrical contact attached in such a way that when any office key of the building was inserted in the cylinder and turned, a contact would be formed which would ring the bells on the intercommunicating telephone system in the building. This is used when the building is locked up and it was necessary to call the watchman to let in a tenant or employee.

Some Old Time Windmills

In roaming over that portion of Massachusetts designated on the geographies as "Cape Cod," one is quite apt to get the impression that many of the inhabitants must have come from Holland, or at least are partial to the methods and customs of that country. This impression is created by the old windmills now valuable landmarks which are to be seen here and there dotting the landscape. In fact, one of the greatest spectacles on Cape Cod is its old windmills,

of which there probably now exists some half dozen or more on the Cape, but the like of which there are probably no more to be found in the United States.

Years ago these structures were built for the purpose of grinding corn into meal or pumping salt water into wooden vats to manufacture salt by evaporation. The salt works disappeared many years ago and most of the mills are in such condition that they can no longer be used for the grinding of grain, but their usefulness, however, is by no means at an end, for the summer residents for the most part have bought the mills and had them removed to secluded spots where they will be free from devastation.

Undoubtedly the oldest mill is at Harwichport and is known as "Baker's Mill." It is said to have been built in 1690 and at present there are only a few shingles on its walls. It looks as if it might tumble down almost any day, yet it continues to resist the elements and stands as an old-time relic that reminds one more than ever of Holland.

At Brewster, however, there is an old windmill which is still in working order and does good service for the blacksmith who is its owner. With its power he saws all his firewood, grinds grain in large quantities, makes cider during the fall months and turns it to account in various other ways. It is said that it is able to grind 100 bushels of grain in an 8-hour day when there is a fair breeze. The mill has four "fans," each of which is 15 ft. long, and 6 ft. wide. On these are stretched strips of tough canvas which form the "sails." Each fan is set at a slight angle, so that the wind blowing against it forces it over. It is made on the same plan as an ordinary windmill, and is faced toward the wind, so that the whole force comes against the surface of the canvas. The entire mill itself sets upon a sort of "railroad track," the wheels turning the structure to the desired point of the compass. When set at the desired angle and all is ready, the fans are unchained and the machinery is set in motion with a rumbling sound, very much like that of distant thunder or the whir of revolving paddlewheels on a Mississippi River steamer. The mill is also made to turn grindstones, separators, washing machines and the like. In fact, it is of which power that it readily takes the place of a gasoline engine for doing work about the homestead. The mill was moved from Orleans in 1868 and since that time it has served the owner constantly.

At Chatham there is a mill built 125 years ago and located on an eminence known as "Mill Hill."

Nantucket Island also boasts of an old windmill built, it is said, in 1746.

The Country's Oldest Building

One of the really historic buildings in the United States is said to be the residence of the Governor of New Mexico in the city of Santa Fe. It is said to have been erected by the Spanish when the greater part of the Western world was theirs and was the finest house in the colonies. According to legend millions of dollars were spent on the quaint old structure. Most of the material in it was brought from Spain and it was constructed by the best builders to be found among the Dons of that period. In the ship which brought over the building material and builders were many art treasures used to decorate the finished house.

After the Spanish went Mexicans used the house as a governor's palace and with the overthrow of the Mexicans by the United States Government, it was continued as the residence of the head of the territorial government that was formed. The house is still in use and there seems to be every reason to believe it will continue to house many of New Mexico's future Governors.

THE PUGET SOUND COUNTRY AND THE DOUGLAS FIR

A Trip Through Western Washington, Where the "Forest Primeval"
Is King and the Lumber Jack Is Prime Minister

BY BERTRAND SHERBURNE

THE shoe drummer got off first, then the patent medicine man, and I followed our medical friend on to the station platform, where a single dingy oil lamp wrestled ineffectually with the gathering darkness of the August evening. The rain drizzle increased as I made my way over to the log structure which housed the general store. As I joined the group around the post office window I overheard the remark:

"But they both got away."

"What was it that got away," I inquired?

"Couple of bears," said one. "Hen. Johnson saw 'em this morning over on the south shoulder of Jumbo

up the capital to build a cable-way and a smelter."

I made my way to the Commercial House and assisted the shoe drummer and the patent medicine man to dispose of the Hamburg steak and onions, followed by a liberal but clammy piece of apple pie.

The next morning was clear and beautiful, and as I dressed I could see from the window a little filmy cloud wander timidly along the edge of the great white glacier far up on the side of Jumbo Peak. The Cascades have never yielded great stores of mineral wealth, but they possess a bountiful store of the most beautiful scenery on the American continent and a



The Puget Sound Country and the Douglas Fir—A Single Log is Frequently a Carload

Peak. He followed 'em about a mile, but they could climb better 'n he could. I got a big fellow myself, though, 'bout ten days ago," added the speaker.

Then, at his invitation, I followed him over to his cabin, where he showed me the skin of a large black bear which he had cured and hung up in the loft.

"What have you here," I said, as we descended.

"Those are off my claim," he answered.

I noted one piece of molybdenite and a couple of pieces of chalcophyrite.

"Lots of pay ore in these mountains if a fellow could only get capital to develop it," continued my friend. "I've got a good claim over on Gold Mountain that would pay big if I could only get some fellow to put

liberal portion of this was spread out before me as I made my way down the road.

After a couple of hours' walk I came to a small house, built on a stump in a clearing. This description would necessarily have applied to a doll house in the East, but in this case the house was a real dwelling, for the stump was about 12 ft. in diameter, cut off about 10 ft. from the ground, and the house was entered by steps leading up the side.

Before I could ascend the door opened and a cheery-faced, broad-shouldered man appeared. I introduced myself and he greeted me with hearty good will.

"Lucky for you you came when you did," he said. "The camp's about a mile back in the woods up on the

other trail, and I just came down here for my scale."

As I followed his lead back into the recesses of the great forest I began to feel the loneliness close about me, and I voiced the thought which came.

"Don't you get pretty lonesome spending your life up here in the woods?"

"No, I enjoy this sort of thing," he replied. "I'm glad to get back to it. You see I don't wear a blue flannel shirt all the time," he said, almost apologetically. "I've been down in Olympia a large part of the time for the last two years. I served a couple of terms in the Legislature down there and had a chance to get in my say for decent government. I made two or three of 'em sit up a bit, too," he chuckled thoughtfully.

Felling Douglas Fir Trees

When we reached the camp I followed two of the men out into the woods and had my first sight of the felling of one of the great Douglas firs which have helped to make the Puget Sound country prominent on the map. The specimen selected was a giant tree about 10 ft. in diameter at the base. As a preliminary, two slots were made in the tree and a plank was inserted in each, which projected out from the surface of the trunk a sufficient distance to enable a man to stand comfortably. These served as the chopping platforms, and the main business of cutting the tree down commenced. Axe and saw were used until finally the great tree creaked and crashed downward, carrying with it three or four small trees.

Then I walked over to where others were cutting the great tree trunks into sections suitable for loading upon freight cars. I learned that this cross-cutting is called "bucking." After the log is cut it is "sniped," which process consists in rounding the edge of the log to facilitate hauling through the woods. After the log was so rounded, the end of a steel cable was fastened about the trunk, the other end being attached to the drum of a donkey engine and the log was hauled through the woods to the railroad track.

Loading the Logs on Cars

Here skids were placed against the side of the flat cars and the logs were rolled on to the cars by means of the steel cables and the donkey engine. Many of the logs required an entire car.

"It is claimed that the waste incident to the logging of Douglas fir is often as much as 30 to 40 per cent.," said my friend. "That much of the tree is actually left in the woods. The top-cut log is likely to be thrown away because it contains defects which would reduce to low grade the lumber sawed from it. The market for such lumber is poor, and it is frequently left to decay, although this is bad policy, as it greatly increases the fire menace. The breakage of trees in felling constitutes a waste of large proportion, though it is usually unavoidable, since the tree's size and weight brings it down with great violence, and if the ground is uneven a broken trunk is likely to result. Then, too, smaller trees are broken by the fall of the large trunks, although we always seek to avoid this."

"I thought you drove your logs down the river in rafts," I said.

"We used to, but the waste of time and material in log jams, etc., together with the uncertain conditions caused us to decide in favor of the railroad," my companion replied. "We are the exception, however, for in the Puget Sound region most of the Douglas fir logs are transported to the mills by water, either by driving on the small streams or by towing in rafts on the Sound. Occasionally roads are constructed on which logs are carried to the mills. The rafting method is often employed by operators along the Columbia River, where the camps are generally near the stream and the logs are brought out of the woods with

donkey engines and skid roads or by short logging roads and then towed in rafts to the mills. In the Willamette Valley and coast regions of Oregon many of the older mills continue to drive their logs, although at the present time a large majority of the logs go to the mill by rail. When driving is resorted to many logs are broken in jams or by impact against rocks or other obstacles. Where splash dams are employed, the waste due to driving is increased by the many logs that are usually left stranded on the banks of the stream and never reach the mill. From 5 to 10 per cent. of the logs may be so wasted. This large item of waste is generally eliminated when the logging is done by rail."

The Logging Camp

We reached the camp an hour after the shadows had crept into the great woods and sat down with the others at one of the long benches before a pine table on which was spread an ample repast of beefsteak, fried potatoes, boiled cabbage, turnips, canned peaches, apple pie and coffee. All of this food was of good quality and well cooked.

The next morning I slept late, for the odor of the fir trees seemed to act as a sedative. My host of the night before had been obliged to hurry away early and had left a note of apology but no directions as to calling me and I had left none myself, as I rarely overslept. Breakfast was long over and when I looked at my watch I did not stop to ask for any. I was some distance from the station when train time arrived but I hurried on and, to my great satisfaction, saw the train still standing on the track. I grabbed the rail of the last car, swung aboard, and tumbled into a seat.

As I sat in the car, expecting every moment that the train would start, I thought of the fine breakfast I might have had had not fate played me such a shabby trick. Still the train did not start and I consulted my time table. It was a late issue and I had made no error. I saw a lone passenger in the other end of the car and approached him with the question:

"Why doesn't the train start? I thought that it left at 8.30."

"Oh, yes, it does say so on the time table, but the conductor and brakemen generally get their breakfast here and they haven't come back from the hotel yet."

I climbed out of the train, made for the hotel and had the satisfaction of filling my aching void before the train crew had finished.

The View Overlooking Puget Sound

The next morning I stood on a high promontory overlooking Puget Sound. Behind me in the east were the great snow-clad peaks of the Cascades, among which I had been the day before. To the north rose Mount Baker, its summit hidden by a dense cloud cap. In the foreground lay the blue waters of the Sound, dotted with wooded islands. Beyond lay the unbroken stretch of the great forest of the Olympic Peninsula, guarded by the jagged line of the Olympic Mountains, snow-clad and towering into the clouds in the background.

At my feet lay one of the great sawmills which represents so much of the invested capital of the Puget Sound region. As I made my way down the path leading to the mill, the roar of the saws became louder. I was stopped at the gate and directed to the office, where I introduced myself and an alert young fellow was detailed to conduct me through the plant.

"I will take you down to the slip first," he said, leading the way to a small stretch of water at the end of the mill building.

Beyond the slip and bounded by the boom timbers lay a great raft of logs where men with pike poles were constantly engaged in pushing the logs into the slip, while others pushed them to a point where the

jaws of the endless chain engaged them and they were hauled up the incline into the mill.

"Do you buy your logs or cut them yourselves?" I asked.

"Both," he answered. "Many mill operators own land and do their own logging, while others depend for supplies upon logging companies. Large areas of timber land are owned by this company and the timber is cut and rafted down the Sound to the mill, but we buy large quantities of logs in the open market at various times during the year. Purchase in the Puget Sound region is according to grade and the grading is done by scalers at the mill," he continued. "Three grades are recognized—flooring, merchantable, and No. 2. The flooring logs are large and sound and yield a high percentage of clear lumber for flooring, ceiling and general finish work. The poorest grades of top logs,

than 30 in. in diameter inside the log and 16 ft. long. No. 2 logs must be 16 in. in diameter and 16 ft. long. No. 3 logs include all other logs classified as saw logs. Timber classed as yellow fir is of slow growth, yellow in color, and cuts a large percentage of clear lumber. Red fir comes from small young timber and yields a low percentage of clear lumber, running largely to common grades, but quite satisfactory for timber and dimension sizes for building purposes. The color of the wood is slightly red. In the Willamette Valley and Coos Bay region no grades are recognized and logs are purchased entirely on a scale basis. The mills in these regions generally get their logs from the nearby holdings."

From the slip we went to the main sawing floor, where I saw the logs pass to the carriages where they were gripped by the great steel jaws and forced



The Puget Sound Country and the Douglas Fir—Sawing the Great Logs Into Merchantable Lumber

knotty timber and small logs containing much sap go into the No. 2 class and are generally manufactured into railroad ties, timbers and common lumber. The merchantable logs are intermediate between the two. The percentage of grades of lumber cut from Douglas fir logs varies with the locality where the timber grows. Occasionally stands yield as high as 35 per cent. clear lumber from an average raft of logs. In other cases the percentage is as low as 15. The average raft in Washington and Oregon yields 20 to 25 per cent. clear lumber. Logs on the Columbia River are usually purchased in raft lots and scaled by grade. Three grades of logs are recognized, No. 1, No. 2 and No. 3. These correspond with the flooring, merchantable and No. 2 logs on Puget Sound. No. 1 logs must be sound and should cut 50 per cent. clear lumber and be not less

against the band saws. Slabs were cut from the side until the timber was squared up and then the timber was cut into lumber which was passed along on rollers and handled by steel fingers until it arrived upon the wharf to be loaded upon a waiting vessel.

I walked up the gangplank of the vessel at the wharf and found myself upon the deck of a great steel freighter. Sauntering amidships I looked down the companionway at the triple-expansion engines, and then forward to the pilot house, where I found an officer.

"What vessel is this?" I inquired.

"The John Ericsson of Stockholm."

"Where are you bound?"

"We're loading three million feet of fir for Melbourne," he replied. "We came over to Seattle from Hong Kong with a cargo of Chinese coke. Then we

got this job, and came up here to take on our load."

"You don't have any regular schedule or regular sailing points, then?" I asked.

"No, we go all over the world, anywhere that we can get the job," he replied. "This vessel is what is commonly called a tramp, rather a well-dressed one at that, though," he added, glancing around at the mahogany finish and the French plate glass of the pilot house windows.

"Where does most of the Douglas fir lumber go?"

"The distribution of Douglas fir is practically worldwide, although the largest part of it is used in the United States. Most of the common one-inch stuff is consumed locally for concrete forms, for sheathing and rough structural purposes, or, when shipped, is sold in the plain state, east of the Rocky Mountains and adjacent regions. I happen to know this because I worked in the mill for several years. The distribution of dimension material does not differ greatly from that of common lum-

ber, except that a considerable quantity is exported to China, Japan, the Philippine Islands, and elsewhere. The large size timbers go all over the world. The Orient depends largely upon them for heavy construction, as does the entire western part of the United States. Much of the massive timbering required by the Panama Canal is of this wood and large shipments go regularly to Australia and Japanese ports where they are resawed into various building forms. Europe affords a market, as do the Atlantic coast states, for many cargoes of Douglas fir timbers that compete successfully with the yellow pines of the south. Douglas fir timber is very widely distributed in all the countries of the Orient, in most European countries, South Africa, South America and the South Sea Islands. Large quantities are sold in the central and eastern parts of the United States through retail yards and the market is growing."

Cypress for Greenhouse Construction

Cypress wood has great durability, which adapts it to many purposes for which some other species are unsuited. Census statistics show that in 1911 over 981,000,000 feet of it were used for lumber, lath and shingles, and that in point of annual consumption it stands seventh among the various softwoods, or coniferous trees. It is used for a great variety of purposes, such as tanks, cisterns, columns, exterior and interior finish, railroad ties, poles and wharf piling. It is especially valuable for greenhouse construction.

Chicago's Coming Cement Show

The progress which has already been made in connection with the Cement Show to be held at the Coliseum, in Chicago, in February next, indicates a most gratifying degree of interest on the part of those intending to participate. All but a very few spaces have already been taken by exhibitors, the first drawing for space having been held on July 29, when preliminary allotments were made. The purpose of this early drawing for space was to afford the management more time to devote to the promotion of the show and the quick response by the manufacturers indicate a sound recognition of the value of the exhibition. It was evident from the first that the decision to hold but one show during the winter and that at Chicago carried with it the unqualified support of the trade. The demand for space has been such that the management has found it possible to exercise some discrimination in allotting

space to exhibitors who make displays of special interest and importance to the industry.

The working out of the installation scheme is already under way, and a large architectural decorating concern in Chicago has contracted for the construction of the principal features of the booths. Instead of the usual arrangement of posts and partitions, large figures and ornamental sign posts will be used with no partition at the back to separate the booths. The sign boards and standards will be cast in plaster according to an ornate design, and will

support an electric light for each individual booth. It is expected that the absence of high partitions will make for a more attractive exposition. It is intended to carry out a unique scheme of decorations.

The exhibits at the Cement Show will be thoroughly representative of all branches of the industry, and will include, among others, manufacturers of large concrete mixers, eleven manufacturers of Portland cement, makers of small concrete mixers, block machines, steel molds, tile machines, steel reinforcing, publishers, etc.

A number of associations will hold their annual meetings in Chicago during the period of the show, all of which will tend to bring out an increased attendance. Among these are the National Conference on Concrete Road Building, the National Association of Cement Users, the National Builders' Supply Association, Illinois Association of Municipal Contractors, National Association of Sand and Gravel Producers, Interstate Cement Tile Manufacturers' Association and the Illinois Lumber and Builders Supply Dealers Association.



The Puget Sound Country and the Douglas Fir—Ships of Many Flags Take the Lumber to All Parts of the World

AN ILLINOIS DISTRICT SCHOOL-HOUSE

A Design for a One-Room School Building Which is Adapted to Meet Varying Requirements of Rural Communities

IN the greater portion of the area of the state of Illinois the farms are large, the average being about one family on a quarter section of land, and the usual size of the school district is four sections of land, with the average number of families about 16. It is felt that the one-room school will be a necessity in the state for many years, and will be the only school which many of the children will be able to attend. In order, however, to meet the demand for school facilities in various parts of the state, the Department of Public Instruction, of which Francis G. Blair is superintendent, has given out in pamphlet form what a one-room school

is furnished with a furnace and coal room, all as clearly indicated on the basement plan. In a case of this kind the front arrangement of the building is reversed and the library and study are placed directly over the furnace and the fuel room is dispensed with. The stairs from the playroom in the basement then rise, as shown on the basement plan, and land where the library and study are shown on the main floor plan. At the right and left of the vestibule are cloak rooms for the boys and girls.

The two halftone views presented upon following pages show the interior of the classroom, one picture



An Illinois District School House—Photographic View—W. Carbys Zimmerman, Architect, Chicago, Ill.

should have and what it should do. The illustrations here presented relate to one of these school buildings erected in District No. 9, known as the "Cross-Roads School," and clearly show the general appearance of the structure as well as the layout of the main floor.

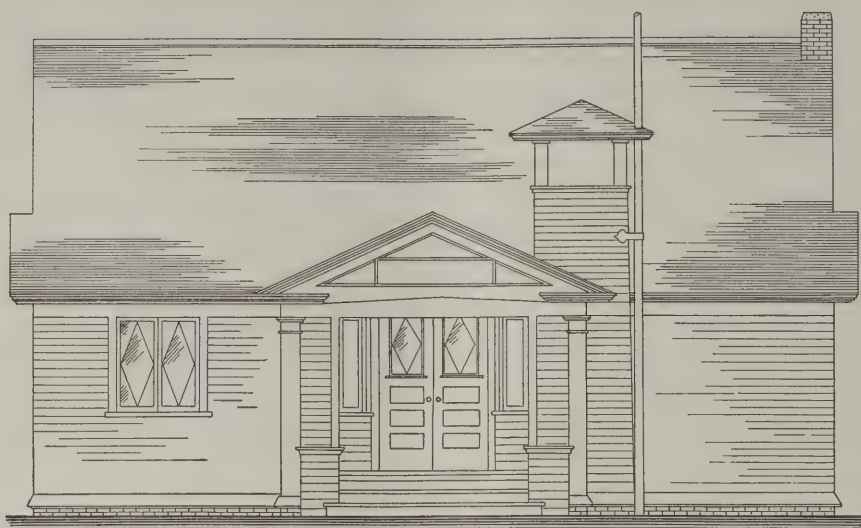
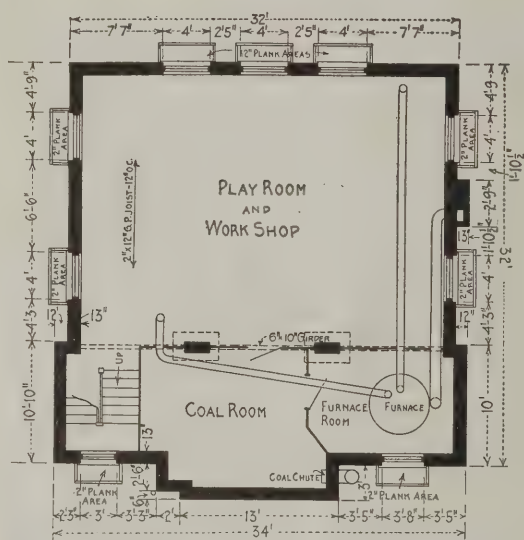
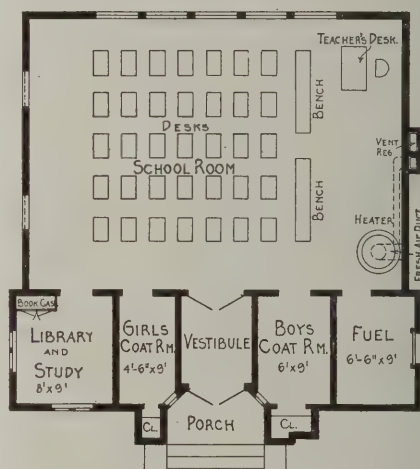
The school building may be erected with or without a basement, and when the latter is the case the heater is placed in the schoolroom, usually in the corner opposite that occupied by the teacher's desk, but in close proximity to the fuel room. The main floor plan presented herewith shows the position of the heater.

When the building is constructed with a basement the latter is used as a playroom and workshop and it

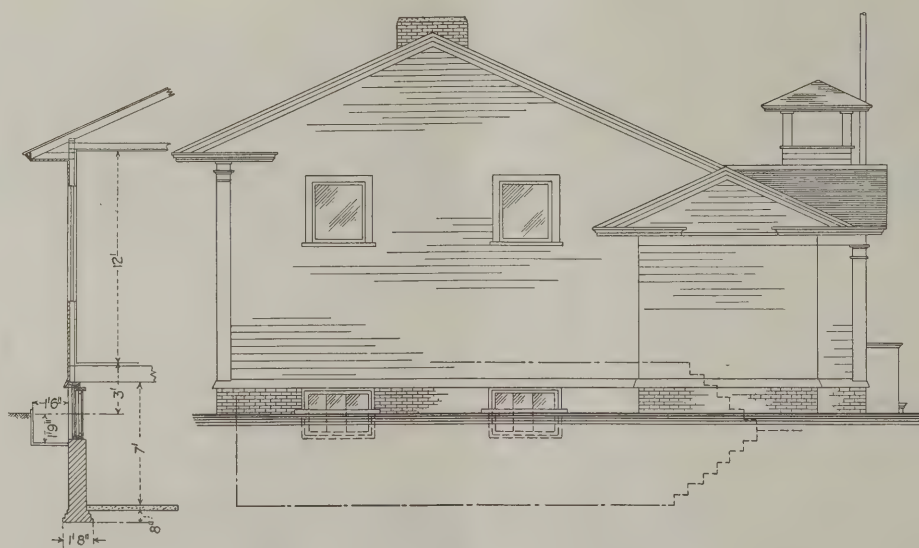
being taken looking toward the teacher's desk, while the other is taken with the camera placed beside the teacher's desk and looking toward the vestibule entrance. This, however, shows the building with furnace in the basement, as the library is indicated immediately at the left, just beyond the register in the floor.

The exterior of the building is covered with siding and the roof with shingles. The chimney and underpinning are of brick.

The girders are 12 ft. long and 6 x 10 in. in cross section. The sills and floor joists are 2 x 8 in., the studs and wall plates are 2 x 4 in.; the ceiling joists are 2 x 6 in. and the rafters are 2 x 4 in.

Front Elevation—Scale $\frac{1}{8}$ In. to the FootBasement Plan Showing Play Room and Work Shop—Scale $\frac{1}{16}$ In. to the Foot

Plan of School Room as Arranged When There is no Basement to the Building

Section and Left Side Elevation of the School House—Scale $\frac{3}{32}$ In. to the Foot

Both the outside and inside double doors are $1\frac{3}{4}$ in. thick and measure 4 ft. 8 in. by 7 ft. in size.

Bill of Materials

In this connection it is interesting to note the bill of materials which reads as follows:

Excavation—

Trench, 142'x2'x4'
4 Piers, 2'x2'x4'.
Chimney pier, 1'x4'x6'.
32'x35'x1'. 85 cu. yds.

Brickwork—

141 5' 9" wall, 5' deep.
1 flue, 1.5'x4'x26' high.
4 piers, 13'x13'x5'. 11.2 M.
6 yds. sand.
5.5 bbl. lime.
5.5 bbl. cement.

Flag Pole Base—

Concrete, 2'x2'x1'. 4 cu. ft.

Chimney Cap—

Stone, 4'x1.5'x4".

Siding, 2,500 x4".

Flooring, 1,450 ft., 1"x4".

Cornice plancier, 225 ft., 1"x4" wainscoting.

Wainscoting, 860 sq. ft.

Lining for fuel room, 250 sq. ft. flooring.

Cornice crown mould, 234 ft. 4"wd.

Finish lumber, base, corner-boards, frieze, ridge-boards and steps, 655 ft.

Doors in Frames—

Outside double doors, 4'8"x7'x1 $\frac{3}{4}$ " G. P. Tr. 16", 5 lights.

Inside double doors, 4'8"x7'x1 $\frac{3}{4}$ " G. P. Tr. 16", 5 lights.

4 doors, 2'8"x7'x1 $\frac{3}{4}$ ".

1 door, 2'6"x7'x1 $\frac{3}{4}$ ".

1 door, 1'6"x7'x $\frac{3}{4}$ ".

Outside fuel door, 2'8"x7'x1 $\frac{3}{4}$ ".

Windows and Frames—

Group of 5 windows, box frames, 2 L. 38"x38".

2 windows, plain frames, 1 L. 32"x36".

2 windows, plain frames, double folding sash, 1 L. 16"x44"

hinged outside.

2 windows, plain frames, single sash, hinged outside, 1 L.

10"x44".

1 flag pole 30' long, 5"x5" and 3"x3", W. I. holder.

Lath, 5,100.

Plastering—

9 bbl. lime.

6 yds. sand.

15 bu. hair.



View in Illinois District School House, Looking Toward the Teacher's Desk

Ventilating Grates in Foundation—

5 vents, 6"x9", cast iron.

Flue Lining—

8"x12"x20' high.

8"x20"x20' high.

Woodwork—

Girders, 6 pcs., 6"x10"x12'.
Sills, 6 pcs., 2"x8"x20'.
Sills, 8 pcs., 2"x8"x16'.
Floor joists, 59 pcs., 2"x8"x12'.
Floor joists, 13 pcs., 2"x8"x10'.
Studs, 108 pcs., 2"x4"x14'.
Wall plates, 8 pcs., 2"x4"x16'.
Wall plates, 4 pcs., 2"x4"x18'.
Wall plates, 4 pcs., 2"x4"x12'.
Ceiling joists, 25 pcs., 2"x6"x24'.
Ceiling joists, 34 pcs., 2"x4"x10'.
Rafters, 52 pcs., 2"x8"x16'.
Rafters, 26 pcs., 2"x4"x14'.
Rafters, 5 pcs., 2"x4"x16'.
For cripples, 40 studs, 2"x4"x12'.
Roof sheathing, 1,100 sq. ft., 1"x4".
Roof braces, 26 boards, 1"x4"x16'.
Roof shingles, 13,000.
Boxing, 2040'x1".

There are also sheet metal, hardware painting, desks, paper hanging, decorating walls and ceilings, heater, ventilating register, fresh air duct, blackboards, walks.

The architect of the school building here shown was W. Carby Zimmerman, Steinway Hall, Chicago, Ill., who states that without basement the building would cost all the way from \$1,350 to \$1,650 according to location, while with basement the cost would run from \$250 to \$300 more.

The building which is rising on the northeast corner of Ninety-Fourth street and Broadway, New York City, the plans for which were recently filed, will be a 12-story apartment hotel estimated to cost about \$200,000 and designed by Schwartz & Gross and B. N. Marcus, the architects. The plot is 33.6 x 113.6 ft.

Quality of the Materials Used in Building Construction

A very vital matter in building construction concerns the grade and quality of materials to be employed and in one of the recent Monthly Letters of Secretary Sayward of the Master Builders' Association of Boston, he comments on the subject as follows:

"I believe that viewed through the eye of owner, architect, builder, materialman or the general public, this subject will be found to present the same aspect and thus prove that the use of the best materials is of the greatest benefit to all concerned.

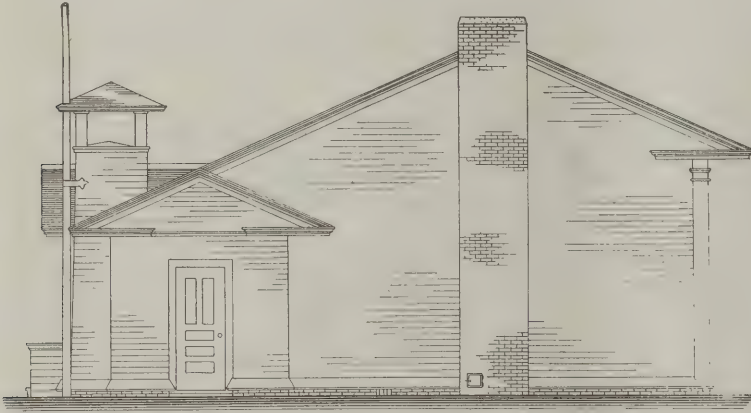
First, from the standpoint of the owner it will be seen that the use of such materials leads to the highest satisfaction because best grade does what is required

(c) working with first-class units the architect is able to combine them into a more effective whole from their physical adaptability and also from the greater moral incentive to good work which the use of the most suitable materials creates.

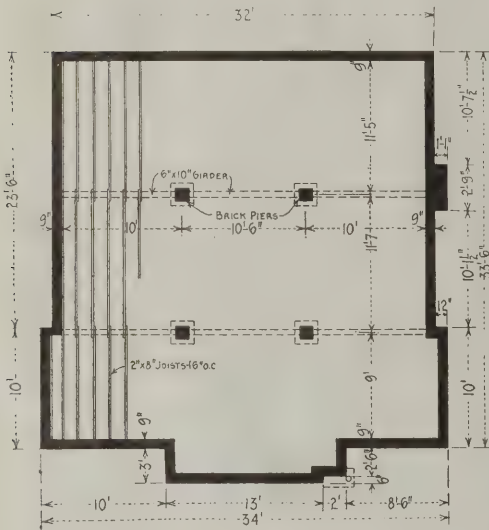
Third, as the builder and contractor view this question, the arguments in favor of the best materials are seen to be very similar to those influencing the architect. (a) Appreciation of the merits of first-class articles which have been incorporated in a building will be pretty sure to reflect credit upon the builder, although he did not specify their use; (b) a good workman is always stimulated to produce the best workmanship when the best materials are furnished; (c) good workmanship is also easier of physical accomplishment through the use of the most suitable materials; (d) deterioration of poor materials always renders the construction work liable to a verdict of bad workmanship, at least from those not specially informed.

Fourthly, we may view the question as a material dealer. Here we see that the use of an inferior article giving unsatisfactory results may reflect upon the dealer despite the fact that this inferior quality may be allowable under the specifications or due to the selection of the contractor. Presumably, also, there is more profit in handling a high-grade rather than a low-grade article.

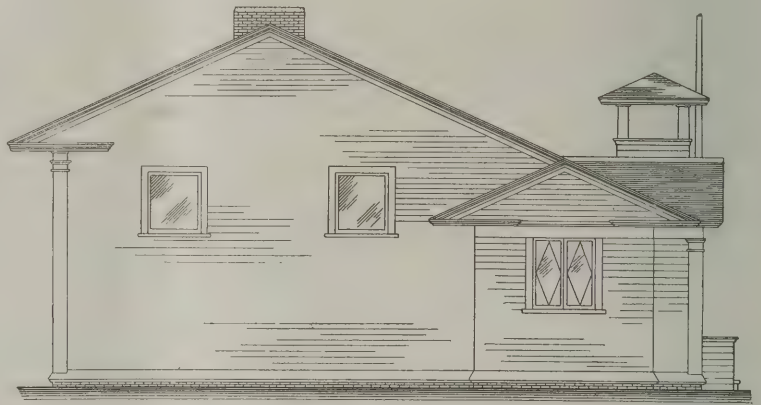
Lastly, from the position of the general public the use of the best materials will prove most desirable because—(a) the use of an inferior product tends to demoralize the appreciation of first-class construction and consequently lowers standards; (b) buildings constructed of poor materials, through the necessity for



Right Side Elevation Showing Door to Fuel Room When Heater Is Located in the School Room



Foundation Plan—Scale 1/16 In. to the Foot



Left Side Elevation—Scale 3/32 In. to the Foot

An Illinois District School House—Elevations and Foundation Plan

by the conditions perfectly and with a greater degree of permanency, thereby lessening depreciation expense. These two qualifications also make for increased rentals.

Second, from the architect's point of view best materials are productive of the best results for these reasons: (a) A first-class article reflects credit upon the architect, for it publishes his knowledge of the goods upon the market and his power to select the most suitable, whereas the use of an inferior grade may throw doubt upon the architect's discernment, whether such selection was made intentionally or not, for the general public will not stop to analyze; (b) from their greater durability, high-grade materials please the owner continuously. The architect will find his client as satisfied with his building at the end of a considerable period as he was at the end of the first few months;

frequent and undue repairs, increase the cost of maintenance to the owner, and this is in some degree reflected on the general community.

History of Brick Arches

In Babylonia, clay was the common building material from the earliest times, as stone was not easily obtainable. Clay also preceded stone in Egypt (cf. Petrie's excavation in Abydos, 1902). In the Aegean, on the other hand, stone and wood were used; brick constructions are almost unknown (Troy II and III, where stone was hard to procure, and Asiatic influences predominated, do not furnish valid exceptions).

Beyond question the corbeled arch was the earliest type known says W. F. Albright in a recent issue of

Scientific American, and a form familiar to the most widely separated peoples. Such highly finished cupola-forms as the famous "Treasury of Atreus" reach the acme of development in this direction. Here, naturally, Aegean architects stopped. Their stone arches were strong and handsome; what necessity was there for change?

In Babylonia (and Egypt) however, where unburned brick was used, such a structure could not have been lasting, since without adequate support the two opposite walls would soon fall in. While repairing this damage, what could be more natural for the mason than to stumble upon the idea of laying the bricks in directions converging toward the centre? In this way the walls would be held apart, and a little buttressing would prevent the bulging. Indeed, the very ruins of our arch might reasonably suggest the improvement.

The Kitchens of Olden Times

The kitchens of olden times seem to have been of extraordinary size, judging from the investigations recently made by an English historical society. At Hurstmonceux, for example, there was a kitchen 28 ft. high, with three huge fireplaces, and a bakehouse with an oven 14 ft. in diameter.

There is an old Welsh kitchen near Llandudno, dating from the fifteenth century, which has many primitive culinary contrivances, now obsolete or superseded by modern devices, says a writer in *Harper's Weekly*. Among these curious old devices may be mentioned a meat-jack with a flywheel, a steel toasting stand, and a fan bellows.

At Battle Abbey there is a curious old kitchen containing much of interest to the antiquary, and a kitchen



An Illinois District School House—View in Class Room Looking from Teacher's Desk Toward the Library Coat Rooms and Vestibule

With the burned-brick arch its evolution was complete, so far as Babylonia is concerned.

A few remarks regarding chronology may be apropos here. The correspondent quotes the chronology of Petrie and Breasted in the same breath, and they differ in the period under question by a thousand years! This leads him to an unfortunate inaccuracy in stating the relative ages of certain Egyptian arches. The dates given by Breasted are based on Eduard Meyer's researches, and are, in their broad outlines, accepted by nearly all Egyptologists. The Babylonian dates are no less than 1,500 years too high, as conclusively proved by Father Scheil's discoveries (1911-1912). Accordingly, 3000 B.C. should be read instead of 4500 B.C.

The new School of Architecture in the Department of Engineering, University of Minnesota, bids fair to prove eminently successful, judging from the number of students who entered on the first of October.

at St. Mary's Hall, Coventry, is remarkable for the famous "knaves' post" to which, it appears, refractory scullions were temporarily attached by way of punishment.

There is a mediæval kitchen at Westminster Abbey, although little remains by which to identify it aside from the rubble flooring, the buttery hatch and an adjoining cellar. Hampton Court Palace shows its "great kitchen," with vaulted roof and sets of antlers on its walls.

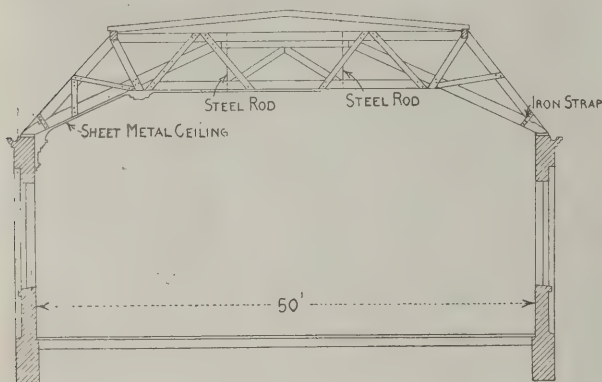
Englishmen of other days fully recognized the advantages of a large kitchen. There is extant an order, dated April 19, 1206, wherein Hugh de Nevill is commanded to have the king's kitchen at Clarendon roofed with shingles and to cause two new kitchens to be erected, one at Marlborough and the other at Ludgershall, in which "to dress" the royal dinners. In this order it is stated that "it is particularly directed that each kitchen shall be provided with a furnace sufficiently large to roast two or three oxen."

CORRESPONDENCE

A Department Where Those Interested Can Discuss Practical Trade Topics—All Are Invited to Participate

Roof Truss for 50-Foot Span

From C. J. M., St. Johns, N. F.—I am sending herewith sketch of a roof truss for a building having a clear span of 50 ft. inside the walls. I want to ask some of the experts in roof framing if it represents a good form of truss, and if so what size of material



Roof Truss for 50-ft. Span

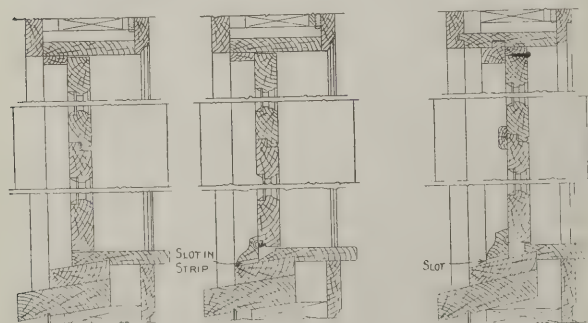
will it require, using pitch pine for all the heavy parts? If it is not a good form of truss what would be the best and most economical form to use?

The deck will be covered with pitch and gravel; the side roofs slated, and there is to be a sheet metal ceiling following the form of the truss.

† The building is 120 ft. long and the trusses are to be spaced about 12 ft. on centers. Any information which the practical readers will furnish will be greatly appreciated.

Construction of Casement Windows

From John Wavrek, Jr., Pennsylvania.—There appeared on page 424 of the September issue of *The Building Age* a communication from H. E. Talbot illustrating the construction of a casement window frame, and from what he says I infer that there has



Construction of Casement Windows

been a discussion of the subject in previous issues. As it has not been my privilege to read the article or articles in question I do not know to what extent the ground has been covered, but I am sure the last word has not been said on this most interesting subject and

I will therefore add something to the theme hoping it will not be plagiarizing.

The casement window as constructed in many cases is a very unsatisfactory affair as regards the keeping out of wind and rain, which effect is evidenced by the many complaints which have come to my notice about them. As the tendency at present is very strong for the casement window and rightly so because it is capable of neat treatment, the members of the building trades and especially the architects should give the feature their best thought so as to design a frame and sash which will give entire satisfaction in keeping out the elements.

Some time ago I was called upon to remedy if possible a very faulty case of this kind which was certainly the limit of poor construction. Even the mildest form of rain storm would find its way to the interior and cloths had to be placed at all the windows exposed to it in order to soak up the moisture as it came through and the sight thus presented was a disagreeable one. Even by placing all sorts of weather strips on the outside the condition was not noticeably improved.

The sketches which accompany these comments show the casement frame as it was built originally, also the changes to remedy the bad features of construction.

I say by all means let us hear more on this interesting subject. The sketches shown in the September issue of *The Building Age* seem to go a great way in making a good casement frame although the rabbet strips are of a somewhat precarious construction. The idea, however, is a good one. I also offer a suggestion along this line in one of the sketches sent herewith.

Problem in Hand Railing

From C. F. S., Brooklyn, N. Y.—I find in looking over the issue of the paper for October that Morris Williams does not accept as satisfactory my explanation given in the September number regarding my diagram in the June issue, which was designed to help the correspondent signing himself "A.E.K."

Respecting my arrangement of the tangents upon which the conformity of the rail to the steps principally depends, his statements show that no explanation whatever could have been satisfactory. In August issue he said my rail followed the winders and was condemned for following them. Now, in the October issue he presents diagrams which he states show it does not follow the winders—a course equally condemnable.

After distinctly instructing the correspondent "A.E.K." that "no arbitrary rule governs the inclination of the tangents" he writes as though his own rule does govern it and classifies even strict architects as incompetent for using the liberty afforded in his precept to "A.E.K."

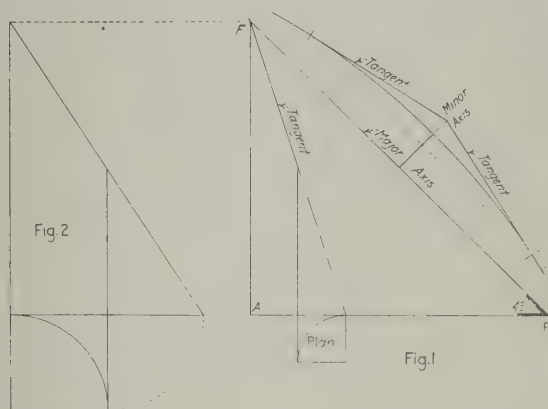
Again, Fig. 1 of the October diagrams shows that my rail does not violate the "fixed point." Either his statement in the August issue saying that it did or his Fig. 1 of the diagrams in the October issue must be incorrect. I leave it to him to say which.

In connection with that part of the problem dealing with the face mold, I show two diagrams which have

to do only with the tangents and center line of mold. Fig. 1 of the accompanying sketches is a repetition of the "principal operation" given in the June diagram. As it will be seen the distance between the foci F-F is equal to the diagonal of a square, the sides of which are equal to the height of the two tangents. I may go further and state that this simple method of finding the foci holds whenever the plan is a quadrant with the tangents at equal pitch.

Assuming the above statement to be true it is evident that the distance between the foci in Fig. 1 is equal to the distance between those for Fig. 2, and it follows that the positions of the foci are altogether independent of the radius of the plan.

This is meant to show that an indefinite number of tests may be applied to determine the truth or falsity



Problems in Hand Railing—Diagrams Submitted by "C. F. S."

of the above statement, and to suggest this course as a better way of testing the accuracy of my method than is adopted in measuring the minute lines of diagram. The diagrams given need no further explanation than that presented in the June issue and the tests suggested which are easily made by any one familiar with the sections of a cylinder should prove interesting to all students of handrailing.

The best that Morris Williams finds himself able to say of my bevel is that "it is correct." Permit me to inquire if anything better can be said about anything.

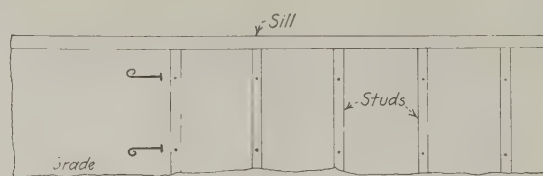
I presume no one will dare to say that much for the bevels shown at *c-o* and *a-o* in Fig. 3 in the October issue. These extra bevels which are necessary to form the joints when the easings are made in the wreath are found in no such easy fashion as he represents; the correct geometrical determination of the joints of such a wreath when both tangents are inclined being considered by many hand railers as one of the delicate problems of the art.

In concluding I would say that the descriptive text accompanying my diagram in the June issue, contains so far as I am able to see no incorrect statement. If then the error of diagram only, could render my attempt so "ineffective" to instruct, what must be the effect of an attempt where errors in diagrams are backed up by erroneous statements.

How to Prevent Stucco from Cracking

From Builder, Clinton Co., N. Y.—A good way for "C. C. S.," Schenectady, N. Y., to fix his rubble foundation walls as outlined in his query in the September issue, is to neatly set up forms upon the outside of the walls before building, having the inside of the forms flush with the sill when ready for the lath. Have ready a lot of 2 x 2's with long spikes let into them with heads flush. Nail to the inside of the forms from the outside and bed the spikes in the wall as it is built,

all as indicated in the accompanying sketch. When ready, nail perforated lath on these studs and on the



How to Prevent Stucco from Cracking

sill. Contraction cracks seem to come anywhere and any time.

Hoisting Rigs for the Builders' Use

From Edward H. Crussell, Sacramento, Cal.—In the first installment of the article appearing under this heading an annoying error occurred in connection with Fig. 3 in next to the last paragraph on page 466 of the October number. Beginning with the fourth line of that paragraph the text should have read as follows:

"Fig. 3 is merely Fig. 1 turned upside down and if the power at *A* equals 50 lb. the strain at *C* must also equal 50 lb. and the weight will be equal to *A* plus *C* or 100 lb. For further and final proof let us suppose that instead of tying the end of the rope *C* in Fig. 3 we stand on top of the beam and hold an end of the rope in each hand. It is now surely obvious that if the weight *B* equals 100 lb. each hand will be supporting half of it or 50 lb. and as soon as we apply enough extra force to either hand to overcome the friction of the apparatus the weight will ascend. We are now prepared to set forth the rule for computing the power of a tackle of any number of sheaves which is, multiply the number of ropes leaving the movable pulley by the force

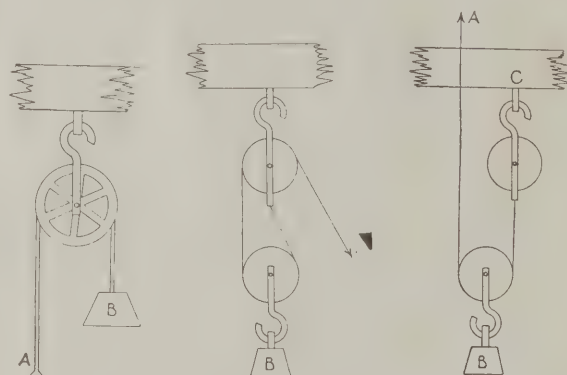


Fig. 1—Single Pulley Hung to Beam

Fig. 2—A Combination of Two Single Pulleys

Fig. 3—Lifting a Weight of Twice the Power

applied, the answer is the ultimate power exerted by the movable pulley."

Note.—We republish in this connection Figs. 1, 2 and 3 in order to facilitate a better understanding of the paragraph in question.

Framing a Conical Tower

From C. J. M., St. Johns, N. F.—There appeared in the October issue of the paper a letter from "J. W.," Victoria, B. C., asking for information concerning a hip roof surmounted by a conical tower. The information he requires as I see it is contained in the development of the covering of a pyramid on a rectangular base pierced at its apex by a cone, as indicated in Fig. 2.

The geometrical solution of this problem which I hope will be useful to "J. W." as well as interesting to others, is as follows:

Referring to the diagram, Fig. 1, let the rectangle *A-B-C-D* represent the base of the pyramid. Draw the diagonal lines *A-C* and *B-D*, also the dividing

lines $F-G$ and $H-I$ producing them indefinitely toward M and T . Now with E as center and a radius equal to that of the base of the desired cone, describe a circle which will be divided into eight equal parts by the lines previously drawn.

Divide each of the four arcs of the circle $a-5$, $5-b$, $b-5'$ and $5'-c$ each into the same number of equal parts, as 1, 2, 3, 4, 5, etc. From these divisions and from a to b draw perpendiculars to the line $A-B$, meeting it in g, h, i, j, k , etc.

From the divisions 5, 6, 7, 8, 9 draw the dotted horizontal lines to meet the diagonal line $B-D$. Draw the line $J-K$ parallel with and equal to $A-B$. Draw the lines $J-L$ and $K-L$, meeting the line $F-G-M$ in

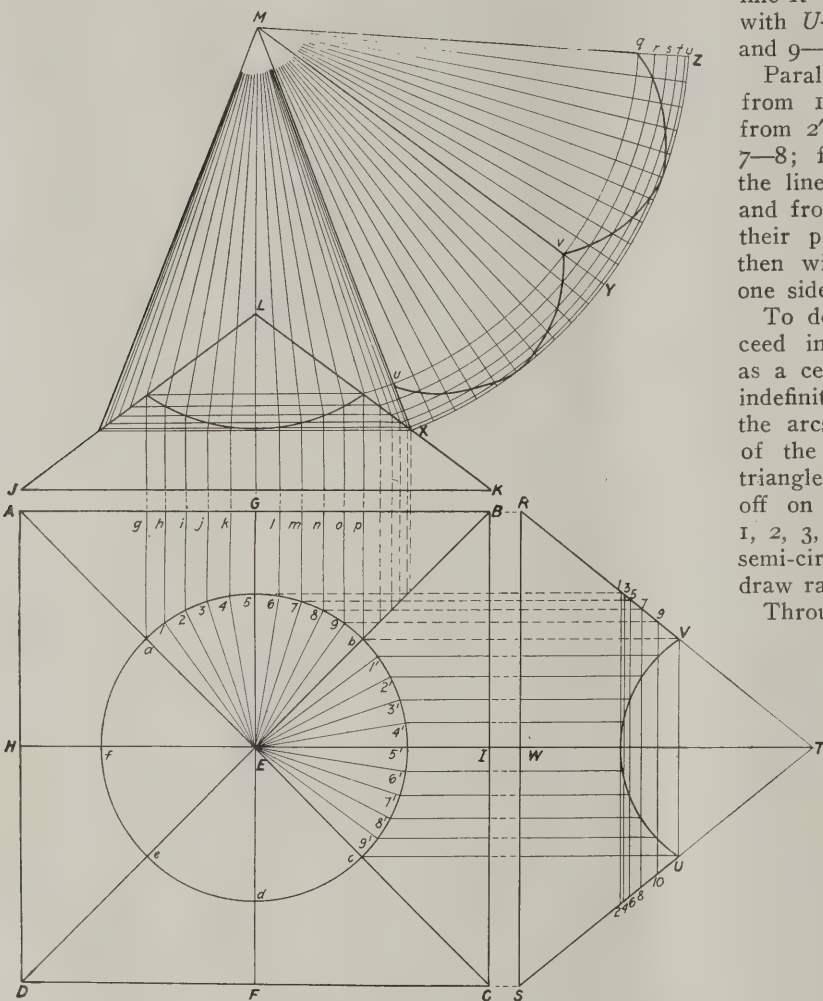


Fig. 1—The Development of the Covering of a Pyramid on a Rectangular Base Pierced at Its Apex by a Cone

Framing a Conical Tower—Sketches Accompanying Letter from "C. J. M.," St. Johns, N. F.

L , thus forming a diagonal representing the vertical height of the pyramid.

From the points where the dotted horizontal lines meet the diagonal line $B-D$, raise the dotted perpendicular lines to meet the line $K-L$ and from their points of intersection draw horizontal lines to meet the line $J-L$.

Extend the lines $a-g$ and $b-p$ to meet the lines $J-L$ and $K-L$ and connect their points of intersection with the horizontal line, thus making six horizontal lines across the triangle $J-K-L$.

Now extend the lines $1-h$ and $9-o$ to meet the second horizontal from the top; $2-i$ and $8-n$ to meet the third; $3-j$ and $7-m$ to meet the fourth; $4-k$ and $6-l$ to meet the fifth, and $5-G$ to meet the sixth. Through their points of intersection draw a curve.

Upon the extended line $F-G$ place the point M to represent the height of the cone and from it draw the radial lines to meet all the points in the curve and all

the points in the lines $J-L$ and $K-L$ formed by their intersections with the horizontal lines. Then $J-K$, $L-M$ will represent a vertical section of the pyramid and cone.

To find the covering of one side of the pyramid proceed as follows:

Draw the line $R-S$ parallel with and equal to $B-C$; upon the extended line $H-I$ point off $W-T$ equal to $K-L$ and draw the lines $R-T$ and $S-T$. From the divisions of the circle b and c draw the lines perpendicular to $R-S$ and meeting the lines $R-T$ and $S-T$ in V and U and connect these points with the line $V-U$.

Next extend the dotted horizontal lines to meet the line $R-T$ in 1, 3, 5, 7 and 9. Draw parallel with $U-V$ the lines 1-2, 3-4, 5-6, 7-8, and 9-10.

Parallel with $b-V$ and $C-U$ draw lines from $1'$ and $9'$ to meet the lines 9-10; from $2'$ and $8'$ draw lines to meet the line 7-8; from $3'$ and $7'$ draw lines to meet the line 5-6; from $4'$ and $6'$ to meet 3-4 and from $5'$ to meet the line 1-2. Through their points of intersection draw a curve, then will $R-S-U-V$ be the covering of one side of the pyramid.

To develop the covering of the cone proceed in the following manner: With M as a center and $M-X$ as a radius describe indefinitely the arc $X-Y-Z$, also draw the arcs q, r, s, t, u from the intersection of the horizontal lines, drawn across the triangle $J-K-L$ with the line $K-L$. Set off on the arc $X-Y-Z$ the divisions $a, 1, 2, 3, 4, 5, b', 1', 2', 3', 4', 5'$, etc., of the semi-circle $a-b-c$ and from these points draw radial lines to M .

Through the points where these radial

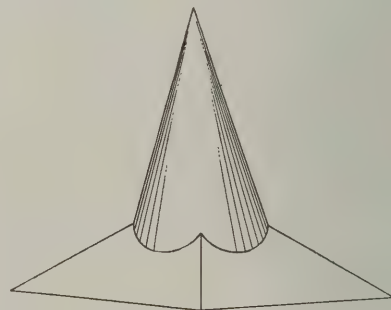


Fig. 2—Perspective of the Pyramid on a Rectangular Base Pierced at Its Apex by a Cone

lines cross the corresponding arcs draw curves as $w-v$ and $v-q$. Then $M-q-v-w$ will be the covering of half the cone.

Analysis of Stresses in a T-Beam

From L. F., Newark, N. J.—A very instructive series of articles on reinforced concrete appeared in *The Building Age* last year by Ernest McCullough, C. E., and for which the readers of the paper, I am sure are grateful.

If not asking too much I should appreciate it very much if Mr. McCullough would give an analysis of the stresses in a beam giving the safe distributed load on 15 x 24 in. deep splayed upward 5 in. on each side, bearing on brick walls at either end, carrying a solid slab of reinforced concrete 5½ in. thick on 8 ft. centers, the beam to be figured as a T-beam. The accompanying sketch will indicate the beam construction.

Answer—All formulas used for T-beams are closely approximate, exact formulas being so complicated that diagrams have to be used. The formulas here given are approximate and in common use. The results are safe. "L. F." gives no steel area, so the moment of resistance of the concrete section must be found and steel supplied to balance it.

If the neutral axis is at the bottom edge of the slab

$$d = t \left(\frac{f_s}{nf_c} + 1 \right) = k$$

in which

d = depth to center of steel,

t = slab thickness,

f_s = unit tensile stress in steel,

f_c = maximum compressive unit concrete stress,

n = ratio of deformation.

If $d < k$ the neutral axis is in the slab and if $d > k$ it is below the slab.

Let A = steel area in square inches,

M_s = resisting moment for steel,

M_c = resisting moment for concrete,

then for $d < k$

$$A = \frac{M_s}{f_s \left(d - \frac{t}{3} \right)}$$

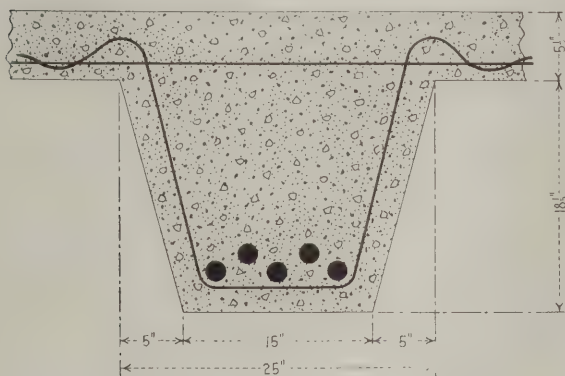
$$\text{and for } d > k, A = \frac{M_s}{f_s \left(d - \frac{t}{2} \right)}$$

Assuming a unit steel stress of 16,000 lb. per square inch; a unit concrete stress of 650 lb. per square inch and a ratio of deformation = 15, then

$$5.5 \left(\frac{16,000}{15 \times 650} + 1 \right) = 14.53 \text{ in.}$$

so the beam falls under Case 2.

Assume a cover of concrete of 1½ in. and another



Analysis of Stresses in a T-Beam

inch to the center of the steel, giving $d = 21.5$ in. The splay of the beam helps increase the breadth which should not be greater than eight times the slab thickness plus the width of the stem.

$$b = (8 \times 5.5) + 25 = 69 \text{ in.}$$

$$M_c = \frac{1}{2} f_c b t \left(d - \frac{t}{2} \right)$$

$$= 325 \times 69 \times 5.5 \times 18.75 = 2,313,000 \text{ in.-lb.}$$

The steel resisting moment must equal the concrete resisting moment, so the steel area

$$= \frac{2,313,000}{16,000 \times 18.75} = 7.7 \text{ sq. in.}$$

Bars or rods of appropriate size may be selected to give this area of steel.

The bending moment must not exceed the resisting moment. If it is less than the concrete resisting moment the steel may be lessened in area to balance it.

The bending moment is obtained by taking the weight of the beam under the slab, the weight of the slab for a width equal to the distance between centers of beams, the weight of the floor on the slab and the weight of the live load, the sum of these being the total weight. If the beam is freely supported the bending coefficient will be 8 and the bending moment will be in inch-pounds,

$$M_b = 1.5 \times W \times \text{span. (in feet).}$$

If the beam is partly constrained the bending coefficient will be 10 and $M_b = 1.2 \times W \times \text{span}$. If the beam is constrained perfectly at both ends the bending coefficient will be 12 and $M_b = W \times \text{span}$. If the load is the uniformly distributed load per square foot then the span is to be squared. The span length to obtain the total weight will be the clear span, face to face of supports. The span length to obtain the bending moment will be the span center to center of supports, but not to exceed the clear span plus the depth of the beam.

Having found the bending moment use it to find the area of the steel instead of using the resisting moment of the concrete section. An ideal beam will have the two resisting moments equal to each other and equal to the bending moment. When the concrete resisting moment is greater than the bending moment then the steel moment can be less than the concrete moment. This effects economy if the size of the beam is fixed and cannot be reduced.

ERNEST McCULLOUGH.

Average Day's Work for a Carpenter

From E. G. H., Atchison, Kan.—I am heartily in favor with the inquiry of "W. F.," Denver, Colo., which appeared in an issue of the paper some time ago and the able answer from J. H. Aurlie, Spring Valley, Minn., which appeared in the April issue. I would like to see others, especially mason contractors give their calculations.

Another thing I would like for the Correspondence Department is to have building contractors give us a list of the average eight-hour day's work a carpenter can do on all kinds of carpentry work, both by the square—100 sq. ft.—and by board measure. I know there are a great number of books on estimating materials and carpenter's work, for I have several of the best ones myself, but I would also like to have the comparison from readers of the paper who are men of building experience and in the business of estimating and contracting.

I do not care for any prices as these vary too much in different parts of the country to be of any particular service. I think writers make a mistake in trying to give prices; for instance something like this: "It is worth \$1 a square to lay 4 in. flooring, etc." Dear readers, give us the average time required to do the work and we can easily compute the cost from the wages paid in that part of the country in which we happen to live and labor.

Door and Window Frame Work

From J. C. Taylor, Louisville, Ky.—Of late there have been some interesting points brought up and suggestions made in connection with window and door framework for machine woodworkers and of which carpenters and builders should also be taking note. Among them is the matter of adjustable door frames with adjustable jambs to facilitate fitting the doors and to enable the householder to adjust the doors without dressing off some of them afterward when the house settles a little or the door slightly sags. In connection

with windows one of the live topics is that of devising frames and sash which will enable the windows to be reversed for cleaning or to in some way eliminate the risky, burdensome job of getting outside to clean a window as it is hung in the regulation way. This is turning attention more than heretofore to casement and hinged windows and is arousing inventors and bringing out many new offerings in windows and window hangings that have a certain effect on the frames to contain them. All of this should furnish interesting matter for study on the part of the carpenters and builders for they have an equal chance with machine woodworkers to devise something worth while.

Another thing that is getting some attention, and needs it, too, relates to the trouble met with in putting window and door frames into brick walls or rather the building of brick walls around frames. The frames show a chronic disposition to buckle under the effect of being enclosed in brick walls and much of this trouble is attributed to moisture that is absorbed from the green walls. Part of it is due to that, but not all by any means, and the conclusion has been reached by some people that the main trouble comes from the settling of the walls in drying out so that they bring weight on the top of the frames, thus causing the sides to bow or tend to buckle. What will have to be devised to relieve this trouble is either a frame that will be adjustable to this settling of the walls or else a method of constructing walls and frames in conjunction so that room will be left for the settling without its doing injury to the window frame. This may not be a serious matter in some of the larger structures where strains are carefully looked after by architects, but in the building of ordinary homes and the more modest store buildings there is a much more general use today of brick and concrete for walls than formerly and it is in this work that the problem of framing in windows and doors so as to get an entirely satisfactory job is giving trouble. It is something to which carpenters and builders may well give a lot of attention and some spare time during the winter to experimenting with a view to devising either some means of constructing a frame or some method of uniting frames to walls in such a way that provision will be made for the settling of walls so that they may not put unnecessary strains on or disturb the frames in any way.

Loose Cap Retaining Wall

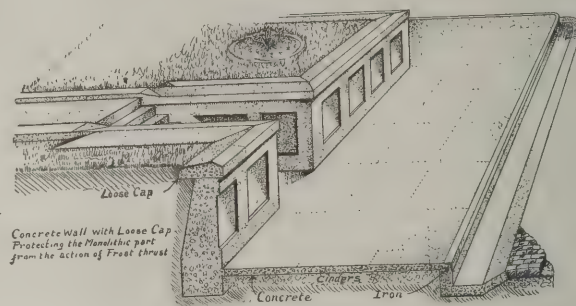
From W. B. G., Louisville, Ky.—Some of the readers of *The Building Age* should be interested in the loose cap wall represented by the sketch which I send herewith. It is one of two walls erected at the same time on the same terrace. The wall not shown was monolithic throughout with panel effect, giving it with the slightly overhanging flag about the same exterior appearance as that of the wall here illustrated. On the bank side only the change of batter from slant to upright gave added thickness for a cap-like finish above the trimmed level of the lawn.

In the wall shown the monolith stops some 6 in. below the level of the lawn and is surmounted by a loose concrete cap as indicated. The bank overhang of the cap is 8 in. Horizontal frost thrust does not reach the wall proper with appreciable force and its effect is to slide the cap and increase the exterior overhang. The lifting action of the frozen bank tilts the cap but allows it to re-seat practically in its original position.

The mixture used in the construction of both walls was made up of one part Portland cement, two parts sharp river sand and four parts random gravel—large and small, ranging in size from $1\frac{1}{2}$ in. to $\frac{1}{2}$ in. This was hand mixed with shovels and hoes, just wet enough to bring a muck to the top when lightly tamped. An effort was made to keep a stiff mixture of two of sand

to one of cement banked up against the face of the "forms" ahead of the filling as the wall was built, the idea being to give the marginal gravel a bedding of material without having to feed the bedding to the sides more or less by tamping.

The face of the wall was trowel finished with a one-to-one mixture. The writer, however, attaches no



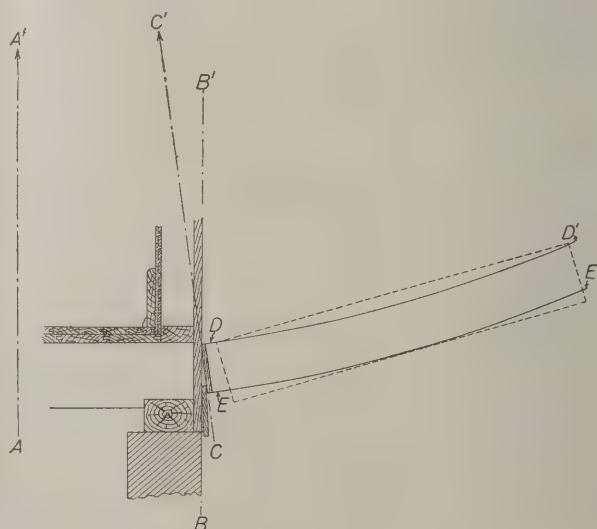
Loose Cap Retaining Wall

special importance to the material, proportions or methods of placing the ingredients of the walls so far as their behavior is concerned. The loose cap, its thickness and overhang on the bank side simply protect the wall proper from frost action in one case, while frost thrust was permitted full sway at the point certain to create the greatest damage in the other.

After three years the wall not shown was bulged and cracked in all the long stretches not anchored by heavy returns into gateways or corners and at present needs re-building. After ten years the wall here illustrated is perfect in the body, but it will take a day to realign the cap which has been thrust from 1 in. to $1\frac{1}{2}$ in. The corner pieces of the cap are solid; that is, there are no jointed miters.

Cutting Siding on a Circle

From E. H. B., Hampton Institute, Va.—In answer to the inquiry of "L. R.," Rice Lake, Wis., in the November issue of the paper, I would say the best results are reached by using siding cut from $\frac{1}{2}$ in. material.



Cutting Siding on a Circle

The edges of the siding are cut in a curved line by using the radius found in the accompanying sketch.

Lay out the center line $A-A'$ and the sheathing line $B-B'$ parallel with it and at a distance from it equal to the radius of the circular bay or tower. On the line $B-B'$ draw a section of the siding in its correct position and extend the line $C-C'$ until it intersects with the center line $A-A'$. The point of intersection will be the

center from which to draw the arcs representing the edges of the siding as *D-D'* and *E-E'*. The dotted lines indicate the $\frac{1}{2}$ in. material from which the siding is to be cut.

After the first piece is cut out it can be used as a pattern or template for the rest.

It is not necessary to make the drawing full size as a smaller scale will answer the purpose and the arcs can be drawn full size from the scale drawing by using the method given in the November issue of *The Building Age* by "Anonymous," Norwich, N. Y., and which appears under the heading "Striking Segment of Circle Having a Long Radius."

This method of cutting siding for a curved surface will keep the edges in a horizontal line.

A Workmen's Time Check

From C. F. Kettle, Grand Rapids, Mich.—For the benefit of "A. J. W.," of Beach, N. D., whose inquiry

Form 1

Job No. for 1913

#	Name	Rate	Hours	Wages	Cost	Profit
1	John Doe	7.00				
2	etc.					
3						
4						
5						
6						
7						
8						
9						
10						
11						
12	C. F. Campbell	5.50	00			
	by	1.50	00			
						Total amount for year

total cost of labor for each job; the total cost of each job, and the total amount of profit or loss for each job, also a ready reference for a similar job in the future.

Under remarks on Form 2 I have the foreman enter any stock taken from the job or of any stock left on the job when completed; extra work done, etc., etc. I also number all invoices when received for each job.

I will wait and see if any one has anything better to offer before giving my system on uniform size cards.

Plans Wanted for Small Apartment Houses

From M. A. D., Elmsburg, Wash.—I would like to see published in the paper plans of some small apartment houses showing suites of two and three rooms each to a floor. We have a corner lot 60 x 120 ft. in area and want to build on it an apartment house about 35 ft. wide with a hall running through the center and with two three-room and two two-room apartments on the first and second floors. We want to build this so

Form 4

Job #12 Mr. C. Campbell

Contract	Amount	First Week Pay Roll	6-00
June 1 By check	1500.00		
June 15 " "	2000.00		
" " Extra Order	2000.00		
" " 20 By check	2150.00		
" " 30 By check	1750.00		
Total Amount of Job	5650.00		
" Cost "	4950.00		
Profit	700.00		
		Lumber	
		Mill Work	
		Mason	
		Plumbing	
		Painting	
		Heating	
		Miscellaneous	
		Total Cost	4950.00
		(See on this side)	

Form 2

C. F. KETTLE, Architect & Builder,
1042 First Street. TIME SLIP.

WORKMAN NAME	M	T	W	T	F	S	TOTAL
C. Brown				9	9	9	27
" "	9	9	9	9	9	9	54
" "	9	9	9	9	9	9	54
H. Jones	9	9	9	9	9	9	54
Third week Pay Roll							\$78.30
REMARKS							
Week Ending 6/7/13 Signed Frank Brown Foreman							

Form 3

Job No. 12

Workman's Name	6	7	8	11	12	18	etc.	etc.	Total Wages
A. Jones	2.60								2.60
B. "	10.80					10.80			21.60
C. "	16.20								16.20
A. Brown	48.60	7.20				14.40			21.60
B. "		8.10				16.20			24.30
C. "		15.30	10.80	10.80		41.40			21.60
D. "			10.80	10.80					21.60
E. "			21.60	10.80	10.80				21.60
F. "				32.40	24.30				24.30
G. "					21.60				21.60
H. "					21.60				21.60
					78.30				
Total Amount of Job 48.60 + 15.30 + 21.60 + 32.40 + 78.30 + 41.40 = 237.60									Wages 237.60
Job for one week									

A Workmen's Time Check—Forms used by Mr. C. F. Kettle

appeared in the August issue of *The Building Age*, I am sending a card system which I have about completed. I have used Forms 1, 2 and 4 a number of years, and about six months ago I started to use Form 3, which I have found the most satisfactory system or method of recording different jobs I have ever tried.

Form 1 gives the number of each job; the number of jobs for one year and for whom the work was done; the amount of each job, and the total amount of business done for one year.

Form 2 gives the name and total amount of time for each workman for one week on each job, and the total cost of labor for one week on each job, taken from Form 3.

Form 3 gives the total amount of wages of each employee for one week; the total cost of labor for each job for one week, and the total amount of payroll for one week.

Form 4 gives the total amount of each contract; the

that we can add to it at the rear later on and cover the entire 120 ft. extending to the alley.

Laying Out a Shed Roof

From W. F. D., Clymer, Pa.—I am a subscriber of the paper and come to the Correspondence columns for assistance. I am just beginning the carpentry trade and would be glad to have some of the readers explain the best way of laying out a shed or lean-to roof.

Design Wanted for Modern Brick Church

From O. S. W., Robinson, Kansas.—Will some of the architectural friends of the paper furnish for publication elevations and floor plan of a modern brick church to cost in the neighborhood of \$8,000 to \$10,000.

Although Manhattan Island has already several hundred theaters the number is constantly being increased.

A Shingled Bungalow

The striking effects which may be obtained through the use of shingles as the exterior covering of a cottage or bungalow is clearly demonstrated in the picture presented upon this page. Not only are the exterior walls, gables and roof covered with shingles but the porch columns from base to cap are also treated with this material. The bungalow has six rooms on the main floor not counting a commodious pantry and bath room. The stairs to the rooms in the attic rise from a hall located toward the rear of the building and with which communicates a majority of the rooms. The kitchen is reached by a flight of eight steps at the side of the house leading to a back entry in which there is room for the ice chest.

The house is built upon sloping ground so that at the front it is one story in high and at the rear there is a full story for the basement.

The frame is of spruce covered with sheathing boards, over which is placed a layer of building paper. This in turn is covered with Oregon red cedar shingles stained and exposed 4 in. to the weather.

The basement has cement floor and contains the hot-water heating apparatus.

The finish in the living room is red birch as is also the mantel, while the floors are quartered oak. The dining room has built-in china closet and beyond this is the pantry through which communication is established with the kitchen. The dining room has a 6-ft. dado.

Officers of Cincinnati Chapter of Architects

At the forty-third annual meeting of the Cincinnati Chapter of the American Institute of Architects, held



Main Floor Plan—Scale 1/16 In. to the Foot



A Shingled Bungalow—Designed and Erected by Lewis H. Lovering, West Medford, Mass.

The bathroom is equipped with modern plumbing fixtures and the walls are finished in hard plaster marked off to represent tile. The kitchen is finished in the same style. The chamber on the second floor is finished in white.

The bungalow here illustrated was built for W. H. Tasker on Cedar Road, Medford, Mass., at a cost of about \$4,000 by Lewis H. Lovering, 38 Boston Avenue, West Medford, Mass.

on the evening of October 22, A. O. Elzmer, the former president of the chapter was re-elected by unanimous vote. The other officers selected were Louis G. Dittoe, vice-president; Henry N. Hooper, treasurer, and Joseph G. Steinkamp, secretary.

Billings, Mont., is preparing a new building code which will be ready early in the spring.

QUANTITIES AND QUANTITY ESTIMATING

Discussion of a Movement to Establish in the United States a System of Estimating Similar to That in Vogue in Great Britain

BY SULLIVAN W. JONES*

THOSE of us who are most deeply and actively interested in the movement to establish the quantity system, a movement which is now well under way, have encountered some obstacles and much pessimism. The chief obstacle is the architect's indifferent attitude toward the existing unwholesome conditions in the field of building. He may not realize it, but his attitude and inertia is largely responsible for their continuation. The pessimism is on the part of the contractor, and is almost wholly due to this very indifference on the part of the architect.



This indifference on the part of the architect is a matter of temperament, and I find therein sufficient excuse for making some radical utterances. The architect has shut himself within a temperamental shell of complacent omniscience which must be penetrated. The architect's interest must be aroused even if he be offended in the operation.

Before I am fairly launched upon the subject I want to explain that I am not so rash or ignorant as to belittle or brand as unimportant that one and only real essential to good architecture—the inherent ability and good taste in the individual to conceive and produce the beautiful, and the power to analyze and translate the quality of charm into concrete form. The purely business side of architecture is incidental. Beautiful buildings are somehow erected even under conditions which are in complete discord with and subversive to sound and efficient business principles.

My appeal is directed more particularly to that individual in every architect's office whose function it is to "beat-up" the contractor and secure for the owner something approximating his money's worth. This individual's task is unnecessarily trying and difficult, because he has no staunch wall of indisputable contract facts to place his back against and because he has no firm ground on which to make his fight. His opponent, the contractor, by force of circumstance and necessity has become an expert in working the architect into an untenable position and selecting the vulnerable spot to strike. This success of the contractor is commonly called "getting away with it." Now, as a matter of fact, he is not getting away with anything; he is simply fighting to prevent the owner from getting away with it.

The contractor's fight is waged to secure reasonable profits. He is fighting for his livelihood. With him the outcome of the fight is usually a matter of grave moment. Conflict in business—making a distinction between conflict and competition—is invariably the product of misunderstanding or the absence of the element of equity in an agreement. Let us now discover the application to the building contract.

The plans and specifications are the fundamental ele-

ment in the contract. The contract itself is of secondary importance. The truth of this statement is witnessed by the recently issued Standard Institute Documents, in which all of those elaborate blanket clauses, which we have habitually placed in the contract, are found in the General Conditions.

The explicit purpose of the drawings and specifications is to define and limit the amount of work to be performed under the contract. This they should do with such clearness and precision that there can be no doubt in the bidder's mind as to the amount and character of the work called for, and that all of the bidders may compute their estimates upon precisely the same basis. It is in the failure of the drawings and specifications to perform this essential function that we find the roots of all of the evil, corrupt and ethically dishonest practices in the building business, and the compelling need for reform.

The drawings emanating from the average architect's office are unintelligible and lacking in pertinent information and detail, and it is not an exaggeration to state that the specifications are rubbish.

Now let us go back and watch the contractor. He receives the deficient drawings and ambiguous and meaningless specifications, and is asked to submit a price for which he would execute the work they are supposed to illustrate and describe. The contractor is not a mind reader, and feels a very natural reticence about bothering the architect with what the architect terms "foolish questions." He therefore proceeds with the work of taking quantities with more or less difficulty according to the scope and complexity of the work and the degree of clearness and completeness of the drawings and specifications. It is perfectly obvious, that under such circumstances the chances for making errors in the quantities are enormous. However, the bills of quantities are finally prepared and priced up, and together with the total result are submitted to the close scrutiny of some astute and experienced person who, according to his judgment in the circumstances, shaves off the figured profit and even cuts the figured cost, if he thinks it necessary, considering carefully the character of his competitors, his chances for recouping the probable losses showing on the bidding sheet through substitutions of cheaper materials for those specified, through securing profitable extras, and through taking advantage of ambiguities and omissions in the drawings and specifications and the discrepancies between them. He does these things not by preference but by necessity. He must first secure the work and then exert himself to the utmost to make a profit.



The bids go in, and the unfortunate contractor who has made the most serious error in quantities or taken

*Vice-president and treasurer of the Association of the United States Quantities Surveyors, and a member of the well-known firm of architects, Palmer, Hornbostel & Jones, New York City.

the longest chances is awarded the contract. He usually sits up all night following the award trying to discover where his foot slipped. Starting with such a handicap, the contractor is forced to resort to every known trick and subterfuge in the game and to adopt a policy which robs him of the reputation for square and fair dealing. Such conditions are bound to find expression in unsatisfactory work. It is an uncontrovertible truth that the owner never gets more than he pays for, stringent supervision notwithstanding.

Blanket Clauses in Contracts

It is usual and customary to find in either the contract or the general conditions, blanket clauses, vesting the architect with sweeping and arbitrary powers, and constituting him a court of last resort on all questions arising as to the performance of the contract on the part of the contractor. The appearance of these clauses can not be taken otherwise than as an acknowledgment by the architect of his inability to adequately and clearly describe and limit the work. He finds it necessary to charge the contractor with a knowledge of the intent of the contract documents, even though that intent be most obscure, and he finds it necessary to so arm himself to prevent the contractor from taking advantage of loopholes, which he knows exist, to the detriment of the work.

If it were possible to prepare drawings and specifications so complete and comprehensive that there would be no doubt as to their meaning and that there could be no difference of opinion as to their requirements, the architect's obligation would be merely that of guarding against naked dishonesty on the part of the contractor, and violations of contract could be quickly and simply dealt with.

In fairness to the contractor, either the customary stringent and arbitrary contract must be so modified as to afford the bidders protection in bidding upon the basis of a reasonable interpretation of the requirements of obscure and deficient drawings and specifications, or the method of describing the work to be performed be perfected so that the basis of the contract shall be precise and not capable of more than one definite interpretation by the bidder.

The present method of describing the work is clumsy and obsolete and totally inadequate to the requirements of the vast building enterprises of to-day involving as they do large amounts of capital. It is manifestly impossible to produce drawings and specifications of that degree of perfection which is demanded. On the other hand, there are, at least for the present, abundant reasons for adhering to the stringent contract. We must therefore find and provide another means of describing and limiting the work.

An Interesting Comparison

To furnish a premises from which to advance the proposition of adopting the quantity system of estimating as a solution of the difficulties described, I wish to draw a comparison between the cost plus a percentage contract and the contract based upon definite quantities of material. The two are similar in their fundamentals. In both there is no preliminary gamble on the quantities and character of the materials required. In both the contractor's compensation bears a fixed relation to the amount of work performed. And in both sheer efficiency, not shrewdness, spells success. The contract based upon definite quantities has the advantage over the other in that it permits of competitive bidding.

The striking contrast between the esprit de corps on work executed by a competent contractor on the cost basis, and the spirit of evasion and vindictiveness which pervades the work executed under a lump sum contract, awarded through competitive bidding, lends

the weight of conviction to an argument for establishing any system of estimating, removing from the situation the factors of doubt, and producing a spirit of co-operation and fair dealing in the execution of the work. It is therefore proposed that the present system of estimating be replaced by the quantity system now generally in vogue throughout Europe. The system proposed, contemplates estimating on bills of quantities and not on the drawings and specifications.

Position of the Skilled Estimator

With the inauguration of the quantity system, the skilled estimator will step out of the contractor's office into a field of his own with a recognized professional standing. He will be called in by the architect to prepare bills of quantities, just as the various experts are now called upon to perform their professional functions in connection with the preparation of information for bids.

There is nothing revolutionary about the quantity system of estimating. It is generally in vogue throughout Europe and it has been practiced in this country in modified and more or less ineffective forms for a number of years, chiefly by engineers.

The English system is probably the best known and the most frequently referred to. It is interesting to note that in 1909, at a conference between the National Federation of Building Trades Employers, the Institute of Builders and the London Master Builders' Association, all of Great Britain, a resolution was adopted recommending that the members of these powerful organizations decline to bid in competition with one another unless bills of quantities were supplied for their use at the owner's expense. It would give impetus to the movement in this country if some such concerted action were taken by the many contractors' organizations. Any American system must be formulated upon the basis of present American practice in estimating and adapted to the requirements of American methods.

Code Governing the System

As a tentative basis for working out an American quantity system, I would suggest the following code to govern the employment of the quantity surveyor and the operation of the quantity system of estimating:

No. 1. That the quantity surveyor receive a stipulated fee to be paid in all cases by the owner.

No. 2. That the bill of quantities constitute the basis of the contract—a definite amount of work for a definite amount of money.

No. 3. That the drawings, specifications, and bill of quantities be issued for the purpose of bidding. The drawings and specifications are essential to the intelligent pricing up of the bill of quantities, since they serve to illustrate the manner in which the materials are to be worked and their character.

No. 4. That the owner assume responsibility to the contractor for the accuracy of the bill of quantities.

No. 5. That the quantity surveyor be obliged to pass a state examination and receive a certificate, as does the certified public accountant, before he be permitted to practice in his own right, thus establishing his competency.

Let us now consider the various aspects of the operation of the quantity system under the proposed code. The owner may be expected at first to object to being put to the supposed additional expense of the quantity surveyor's fee. This objection is quickly disposed of by an examination of the economics of the present system. Sufficient statistics have been collected to indicate that in this country there is approximately an average of 10 bidders for each job put out for estimate. Following the law of averages, each bidder secures one of the 10 jobs on which he submits estimates. The cost to the contractor of preparing all estimates is charged to overhead and distributed pro rata over all

of the work actually secured. No matter what obscure method of bookkeeping is followed, in the last analysis the fact remains that the owner of the tenth job pays the cost of estimating the other nine in which he has not the slightest interest. Through the adoption of the quantity system, the bidders are relieved of the cost, or the major part of the cost, of preparing estimates, and the owner pays the cost of the estimate for his own job only.

One Effect of the Quantity System

One of the most certain, far reaching and beneficial effects of the quantity system will be the production by the architect of more accurate, intelligent and complete drawings and specifications. This improvement must result from the necessary co-operation between the architect and the quantity surveyor, in the preparation of drawings and specifications, and from them of the bill of quantities. As already shown, accurate quantities can not be taken from deficient drawings and specifications. The quantity surveyor will apply to the architect for information on all points not made perfectly clear. Since the quantity surveyor will be held morally responsible for and his future success will depend upon the accuracy of his bill and its thorough co-ordination with the drawings and specifications in the execution of the work, he may be depended upon to make certain that the ambiguities in the drawings and specifications are cleared up before they are issued. Is it possible to conceive of a more thorough check for accuracy and clearness? Conversely, with such co-operation, it must follow that the bill of quantities can be prepared with a far greater degree of accuracy than is now possible.

With the adoption of the quantity system of estimating and the adoption of the bill of quantities as the basis of the contract, it will be necessary to include in each contract a clause which provides that the work comprehended in the agreement consists of the quantities of the various materials comprising the bill upon which the bid is based, worked in accordance with the requirements of the accompanying drawings and specifications.

Provision for Compensation of Contractor

Each contract should also include a clause providing for increased or decreased compensation to the contractor resulting from additions to or deductions from, the original bill of quantities. Just how this should be accomplished is a mooted question. Contractors frequently claim, and with justice, I think, that extra work requiring the use of small quantities of materials usually placed in inaccessible or difficult positions, should be paid for at a higher rate than the average unit prices fixed by the contract for the original work undertaken. This, however, is merely a matter of the meeting of two minds on the agreement.

In any case it is essential that the basis of the contract should be flexible that it may be extended to cover deficiencies or contracted to cover excesses in the original bill of quantities, and so that it may automatically adjust itself to provide for change in the work, always upon a fair and equitable basis.

If the quantities constitute the basis of the contract, and the contract prices for the various quantities and classes of material automatically adjust themselves to the changes in quantities, there can be no dispute between the architect and the contractor over extras and deductions—and there should be none.

Nevertheless, since extra work must always carry with it a pro rata increase in the contractor's profit, it is reasonably certain that a number of contractors will endeavor to establish claims for extra compensation on the basis of alleged deficiencies in the original bill of quantities.

If all such allegations can be reduced to questions of

fact through the establishment of standard rules and units for the measurement of executed work, there will be little chance, unless the architect is extremely negligent, for the contractor to prove a claim for excess quantities if they do not exist. Every 1,000 common brick billed must mean the same number of cubic feet of finished wall to each and every bidder, to the quantity surveyor and to the architect. The establishment of such standards as a preliminary step to the general adoption of the quantity system is essential to the successful operation of the system.

Work of Establishing Standards

The work of establishing such standards will be taken up by the association of United States Quantity Surveyors, or some similar and properly equipped organization, through committees in each trade. The standards so established will be based upon the best and most equitable practice in each trade, with due regard for the distinctions now made between the various classes of work.

Estimating on bills of quantities will reduce competition between bidders to the sound basis of efficiency. In such competition the factors that will count will be the contractor's ability through capital and credit to buy at the lowest cost, and the efficiency of his organization and methods in construction. A premium will be placed upon skill and ingenuity. The wild-cat contractor, the contractor without financial standing, and the contractor without experience would soon be eliminated. Under such competition they could no longer exist, for the work secured through taking a chance or through blunders would net a loss or dissipate the anticipated profit.

The quantity system will impose upon the architect the necessity of following more precise and fairer methods in the matter of making estimates for payments. All payments will be computed upon the basis of units of materials worked, times the unit price fixed by the contract or deduced from the bid. The contractor will receive the exact amount of money to which he is entitled for the work performed—no more, no less. The present method of making estimates upon the basis of shrewd but safe guessing as to the value of the work performed would necessarily be discarded.

A Concrete City in the Desert

A model industrial village, together with the buildings constituting the industrial plant, is under construction of reinforced concrete in the middle of the Mojave Desert near Death Valley. Reinforced concrete was adopted for the work after an exhaustive investigation looking to the production of permanent, sanitary, fireproof houses which would largely eliminate the cost of painting, repairs, etc. The dwelling houses of the model village will be grouped around a garden court and will be constructed by the use of steel forms as invented by Milton Dana Morrill, the well-known Washington architect. The industrial plant is being constructed by the American Troma Corporation and the factories will manufacture borax and potash.

In discussing the cost of laying building tile the statement is made in the last issue of the Universal Bulletin, that this depends very largely upon the accuracy with which the tile are formed. The process of making concrete hollow tile is such that absolutely true faces and square, sharp corners result and the labor of laying is considerably less than with any other similar building material. This it is stated is a fact ascertained from any mason who has handled tile and other material.

HYDRAULIC RAM HOUSES BUILT OF CONCRETE

A Method of Protecting a Hydraulic Ram That Is Durable and Economical
—Proportions of the Concrete Mixture Used

By PERCY H. WILSON

AMONG the various small devices used for hoisting or pumping water in connection with the modern farm equipment few have been found more satisfactory than the hydraulic ram, especially where economy of operation has been a factor. In order to give the best results a ram should be properly installed, and this means, if it means anything at all, rigidity of foundation and entire absence of everything calculated to obstruct the machine while in operation. "Fixing the ram" is an old-time expression familiar to everybody who has had occasion to use this simple and ingenious device. Sometimes the necessity for "fixing" has been brought about by a dislodged stone in the wall or some obstructing substance in the mechanism.

It will be generally conceded that concrete affords the best means of protection to the hydraulic ram, as it can be made impervious to moisture, durable, and at the same time is economical. The illustration presented herewith shows a satisfactory type of building. A structure of this character will not rot even though in constant contact with moisture, which, as is well known, quickly destroys wood. There are no joints, which invariably become defects in ordinary masonry. Concrete means clean, sanitary and satisfactory enclosure for the hydraulic ram, and will do much to eliminate bills for repairs due to improper installation or an unstable foundation.

To build a ram house of the type shown would not require great mechanical skill. Having prepared the pit or foundation and erected his forms, the farmer would need to observe the following precautions:

Good cement, clean materials and the latter used while absolutely fresh. A mixture of 1 part Portland cement, 2 parts sand and 4 parts stone would make a good concrete. The concrete should be a wet mixture and placed in alternate layers about 6 inches thick, which should be tamped slightly until water comes to the surface. To obtain a smooth surface the mass should be spaded on the side next to the forms immediately after placing. This is done by working a thin wooden paddle to and fro and up and down between the concrete and the side of the form. A spade will

answer where the space between forms is sufficiently wide to permit of its use. The forms should be left in place for at least a week.

The foundation for the ram can be made of the same mixture, and if the work is properly done it will mean a rigid, non-vibrating and everlasting base. Time and moisture will only add to its strength and durability.

Houses That Revolve Upon Their Foundations

An interesting experiment has recently been carried to a successful conclusion in so building houses that the living rooms have constant exposure to the sun.

The house rests on a sort of turntable and may be turned about at any angle or entirely around. The solid foundations do not move but the cottages or villas, a number of which have been built in Munich, and seem to be quite popular, rest upon these foundations with proper turntables, so that they can be made to follow the sun around all day long, having sunlight in the same room from sun rise to sun set.

For invalids who need to be in the sun constantly such an arrangement allows them to rest in their chairs or hammocks on a veranda from morning until night, with the added attraction of

a change in the landscape every little while. These houses are, of course, only villas, like small bungalows, and were first built as a novelty. Now a number of experts are studying them to see if it will not be possible to build something after that pattern for use of patients in a tubercular colony.

A young woman's class in carpentry with 18 enrolled the first day was recently organized in the Public Schools at Toledo, Ohio. Members are first taught the use of the hammer and saw and later will be instructed in making artistic furniture.

The new Chinese republic has established a department of agriculture and forestry. For a long time China had been a backward nation in forest work.



Hydraulic Ram Houses Built of Concrete—A Good Example of Construction on an Illinois Farm

New Publications

Building Construction and Superintendence, Part II.—

Carpenters' Work.—By F. E. Kidder, re-written and enlarged by Thomas Nolan; 910 pages. Size $7 \times 9\frac{1}{2}$ in.; 830 illustrations. Bound in board covers. Published by the William T. Comstock Company. Price, \$6.00.

This is the ninth edition, re-written and enlarged by Mr. Nolan, of a work which has met with great favor among builders and contractors, by reason of its practical nature and the excellent presentation of the various topics discussed. The author of the revision states that he has endeavored to bring the work down to the present day in such form that it will continue to hold a high place as one of the standards of best contemporary practice in the elements of carpentry construction and superintendence. A great deal of new matter has been added and some of that found in the earlier editions has been entirely re-written and re-cast so as to make the phraseology and general style of presentation the same throughout.

The chapter on the "Building and Finishing Woods of the United States" has been entirely re-written and greatly enlarged; the chapter on "Wood Framing" has been enriched with new drawings of timber framing, beam and girder-supports and connections, partition-construction, roof-construction, dormer and eyebrow windows, etc.; the chapter on "Sheathing, Frames, Sashes and Glazing" contains new text matter and new illustrations, as does also the chapter on "Outside Finish and Roofing." The one dealing with "Interior Woodwork" has been in many parts re-arranged and much new data and numerous new illustrations have been added. Another chapter which is virtually re-written in order to bring it down to date is that dealing with "Builders' Hardware."

In the chapter dealing with "Heavy Framing" there is much new matter relating to the framing of non-fireproof stores, warehouses, etc., metal columns and connections of floor joists to girders. The entire subdivision of the chapter on "Mill Construction" has been re-written and copiously illustrated with new drawings taken from the most approved contemporary practice.

The entire work is comprised in eight chapters, the last of which deals with "Specifications," considered under such sub-divisions as carpenters' work in connection with frame and also brick buildings; gravel and slate roofing; interior finish; cellar work, etc.; hardware; heavy framing; store fronts; painters work, and notes dealing with painting specifications. There is an appendix giving data relating to the Strength of Materials, also 50 tables which in number is a trifle more than double those found in the previous edition.

The author of the revised edition has wherever possible referred to sources of his information and among these *The Building Age* has been largely drawn upon.

The matter is arranged throughout in a way to strongly appeal to the ambitious young man who is desirous of making progress in the building business, as well as to the veteran who has already established himself on a solid foundation. Not only this but the work is one which should be found in the library of every architect, builder and contractor associated with building construction.

Diagram Giving Stresses in Beams.—By H. R. Thayer.

Mounted on heavy paper. Size 12×9 in. Published by D. Van Nostrand Company. Price 20 cents.

The author of the diagram is assistant professor of structural design in the Carnegie Institute of Technology and the point is made that the diagram is much handier and easier to apply and less liable to error than

computations or the ordinary tables. By its use the technical man will be able to obtain the design of a beam for given loads and stresses; the design of a beam for given moments and stresses; section modulus required for given loadings and stresses; also stresses caused in a given beam by a given load, and finally stresses caused in a given beam by a given moment. By its aid the size of wooden beams, steel channels, I-beams, or composite girders can be obtained by those possessing an ordinary education.

Hendricks Commercial Register of the United States.

Size $8 \times 10\frac{1}{4}$ in.; 1635 pages. Bound in board covers. Published annually by Samuel E. Hendricks Company. Price \$10.

There has just been issued from the press the twenty-second annual revision of this well-known work for buyers and sellers, the first edition of which appeared in 1891. Since that time it has been revised every year and furnishes complete classified lists of manufacturers for all who are seeking original sources of supply. It covers in a comprehensible way the architectural, contracting, electrical, mechanical, engineering, hardware, quarrying, iron, steel, railroad, mill, mining, exporting and kindred industries. The present edition contains 89 pages more than the preceding one, to which may be added about 348 pages of cancellations, errors, etc., omitted from the twenty-second edition, which gives a total of 437 pages of new matter and representing approximately 390,000 names and addresses altogether. There are over 55,000 classifications.

As affording an idea of the extent of the work it may be stated that the list given of contracting builders requires 44 pages; architects, 29 pages; masons' and builders' materials, 14 pages; lumber manufacturers and wholesale dealers, 24 pages; common brick manufacturers, 10 pages; roofing materials, 6 pages; sash, door and blind manufacturers, 8 pages; architectural and ornamental iron manufacturers, $8\frac{1}{2}$ pages.

The arrangement of the matter is such that the book can be readily used for either purchasing or mailing purposes and in connection with the names of many of the concerns is given the trade name of the product manufactured—a feature of great convenience to those seeking a particular make of article.

A Boy's Workshop.—By a boy and his friends. Size

$5 \times 7\frac{1}{4}$ in.; 222 pages. Numerous illustrations. Bound in illuminated covers. Published by Lothrop, Lee & Shepard Company. Price \$1.00.

This little work as its title indicates is intended for the typical American boy who has a taste for the mechanic arts. Within its covers are plans and designs for in-door and out-door work and there is an interesting introduction by Henry Randall Waite, in which he sets forth many reasons why the book in question should be awarded a cordial welcome. He points out that it will "bring to thousands of lads just such information in regard to the first steps in the mechanic arts as they most need and will enable them with little other direction * * * to so develop whatever mechanical ingenuity they may possess as to make it easy to determine whether they shall ultimately join the ranks of those wholly devoted to the useful arts or continue to be amateurs, using to good advantage whatever skill they have acquired in connection with their occupations."

An idea of the scope of the book may be gathered from the titles of some of the chapters, as for example The Saw Horse and Workbench; the Use of Tools; How to Make a Tool Cabinet; Hinges and Locks; a Book Rest; a Bed Table; How to Build a Portable Wooden Tent; How to Bind Magazines, and Knots. Hitches and Splices.

SOME PROBLEMS OF INDUSTRIAL EDUCATION

An Interesting Review of the Relations of Employers to the Problems of Technical and Industrial Education

BY HENRY V. GUMMERE *

EVERYONE who has studied the subject at all knows the intimate relation between the industrial standing of our country and the knowledge and the efficiency of those engaged in its industries. While this relation holds from the humblest unskilled operative up to the corporation manager, it seems especially important to have those in the lower places realize it, since their educational opportunities are certain to have been the more limited. Thousands of boys leave school yearly from the lower grades to go to work. To most of these will come later a keen realization of lost opportunities and the absolute necessity of making up for them, for they enter commercial or industrial occupations unfitted for advancement to higher positions.

What they can do, how well their capabilities can be developed, will in most cases depend on what possibilities their employer brings to their attention and makes available. Most employers are well aware of this and try to help those who work for them to find ways of gaining the knowledge they need. Experience has shown that as a purely business proposition this pays. A young man whose habits of life are known, whose personality and ability have been tried out, is usually much to be preferred to any stranger when appointments are made to positions of large responsibility.

The scope of this article will not permit more than a passing word regarding the various educational agencies which have been made use of for the purpose of training men for advancement. Its main purpose is to point out some of the many educational problems which must be studied in order to decide upon the best plan of procedure in any given case.

Associations or clubs, whether local or branches of a national body, which meet periodically to hear an address or participate in a discussion are at best educational only in a supplementary way. Any study done in connection with them is not consecutive and usually to be beneficial needs a foundation which is too often lacking. The corporation school is rather new, and for every corporation large enough to organize and conduct one, has interesting possibilities; the tendency, however, is always to train for immediate usefulness in detail rather than in broad principles, while the variety of courses which can be offered is bound to be small. If the school is organized to benefit the workers in the shop, what shall be done with those in the business office who need an entirely different training?

A correspondence school, either within the corporation or outside its control, offers the only means of systematic study for those residing at considerable distance from the large centers of population, or where the number of persons interested in a given kind of work is too few to warrant the formation of a regular class. When schools can be reached where experienced teachers are in charge, where direct recitation methods are used, and where a variety of courses can be offered in a systematic way, the establishment of regular classes in off-duty hours offers the best method of giving the desired instruction. These usually take the form of night schools or evening classes.

Night schools have flourished in the last twenty years wherever established. Their advantages are fully recognized by those who have been attending them.

*Secretary of the Industrial and Technical Education Conference of the Public Education Association of Philadelphia.

Such are: immediate help over difficulties, procured by having an instructor at hand; the opportunity to learn by the mistakes of others in the class; compulsory regularity in study, so important even to a very earnest student; the stimulus of numbers; the desire to stand well in his class; the possibility of drill; and many others. Such school work, offered not only in the evening but in the late afternoon as well, is likely to have a remarkable growth in the future.

To the general public the work which is being done as regards both scope and quality remains practically an unknown quantity at the present time. Employers are just waking up to what has been and can be done in this way. No matter what educational agency is used, a number of problems arise which can be solved only by the co-operation of employers, employees, and teachers. What courses are needed? How much time can be required of busy men for school work? What fees are suitable? How shall those be accommodated who have long distances to travel and high carfares to pay? Should classes be established in locations remote from the schools, in shops or in offices, but under the control of their trained faculties?

These are some of the problems which have never been fully answered. The answers would probably differ with a change in locality. Other questions are almost wholly the concern of the employer, such as: What school and what kind of education can best help my employees to gain what I want them to know? Which of them can profit most by systematic school work? How can I help them to get it?

The only satisfactory way to reach a conclusion on these matters is to have some common meeting ground for all interests where free discussion can have full play. In Philadelphia steps to this end have already been taken. Last spring representatives of the Central Educational Institute of the Y. M. C. A., Drexel Institute, The Franklin Institute, School of Industrial Arts, Spring Garden Institute, Temple University, and the Wagner Free Institute of Science joined with representatives of the Philadelphia Trades Schools and the Philadelphia and Camden Public Schools in arranging meetings for the purpose of becoming acquainted with one another's work and the educational problems employers have to face.

Wishing to avail themselves of the wide resources of the Public Education Association of Philadelphia, members of the faculties of the participating institutions are now organizing a section of that association to be known as The Industrial and Technical Education Conference of the Public Education Association. The membership is to consist of educators and employers, and the purpose is to seek earnestly the solution of the problems arising from the needs of the vast numbers of young people who have never had proper opportunities for securing that knowledge which will pave the way to better service and higher responsibilities.

It is hoped that the movement thus started will spread to include not only local representatives, but all those employers whose employees find in the large city opportunities which cannot be offered nearer. This means extending the work to a great many miles from Philadelphia, for classes could easily be arranged outside the city, managed by experienced teachers who are specialists in any given line of instruction.

POPULARIZING BUILDING TRADE DEVELOPMENTS

Some of the Methods Adopted in Great Britain—The Ideal Homes Exhibition—A Few Details of Construction

THERE are a number of exhibitions for stimulating the building trades industries held annually in Great Britain, among which mention may be made of one where the trade can inspect all kinds of raw materials and see their usefulness right up to the finished house. This is held every two years in the city of London. Our special representative has recently been present at the "Ideal Home Exhibition" which was one of the popular attractions in London during October. That exhibition brings home to the British public the delights of an ideal home, and shows how modern building materials properly applied contribute to the beauty and decorative surroundings of a private dwelling.

In the building known as "Olympia" as vast gathering of model cottages, houses, rooms, and even an entire model village, were staged, so that the thousands of people who visited the exhibition could wander in and out of log cabins, trading stores, and even palatial bungalows. Adding to the general effect of that remarkable scene our representative tells us that the vast building itself was converted into one enormous reproduction of a Pompeian building, the decorations adorning the span of the roof and the sides of the hall being borrowed from the primitive designs and bold colorings of the public buildings of Pompeii. The effect of the imitation terra cotta, black, blue and green of the hall, contrasting with the dead white of some of the model cottages with their charming red tiles was both striking and suggestive.

One of these delightful little homes such as would be found in a rustic village in England—literally, a one-room cottage—is pictured on this page, the illustration being taken from a photograph on the spot.

The cottage problem was very prominently to the front, it being stated on high authority that during the next few years at least 90,000 cottages where families may live in separate dwellings will have to be erected in England. There were single cottages shown as models, covered with Dutch pan tiles, and having a living room on the ground floor with a picturesque ingle-nook, a parlor which could be used as a bedroom, a scullery which also contained a covered bath, and two comfortable bedrooms. Another very useful model

was an exact replica to scale of a pair of cottages, with cooking range, bath and copper, and water supply, which can be put up in England at a cost of \$4,375.

Many delightful rooms were on view, special interest being centered in what were called "perfect rooms," each the ideal, and the design of some well-known lady. H. M. Queen Alexandra designed a charming nursery with furniture in sycamore. H. R. H. the Princess Alexander of Teck contributed an Adams drawing room, paralleled with Wedgwood blue brocade. The Duchess of Rutland selected as an ideal dining room the Georgian period of 1750, paneled in wood and painted in ivory white, the furniture being made of St. Domingo mahogany. Other rooms were equally as attractive.

There was one very beautiful model—an old English garden—designed by Viscountess Wolseley. It represented a Dutch scheme of the William and Mary period. One of the wonders of the exhibition was an electric house, in which the builders had incorporated a plan to provide service without servants. There was the telephone and the typewriter; the dishes arrived on the table on an electric tramway, and the wine circulated during the repast. Electric current was everywhere, the



Popularizing Building Trade Developments—A Model Rural Cottage in Fibrous Plaster by Tanner & Son, of London

hand that rules the world being replaced by electricity, for the cradle was rocked by the current. The scullery had a "Mary Ann" table, where electric motors replaced the old-fashioned elbow grease.

The evidence of up-to-dateness in construction was shown in the very beautiful internal arrangements of the model dwelling in which all the latest building hardware, grates, mantlepieces, and the like were shown. There were some dwellings, too, built on the American principle, and heated entirely by stoves and electric heaters.

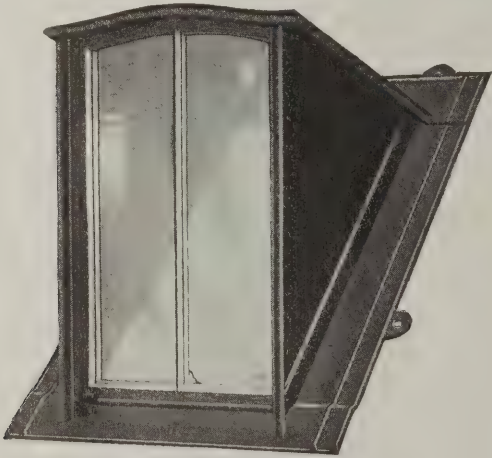
The international character of the exhibition was seen in the model Russian village, to produce which the artist under whose charge the construction was carried out had toured through Russia and studied the prevailing architecture in the rural districts. Faithfully reproducing originals the contractor for the building of this composite hamlet constructed various forms of homes and shops, a farmstead with real cattle graz-

ing, a five-domed church, and a chapel. There was a waterfall and a wheel, and a windmill and a granary. There was a village school and the inevitable inn. The churchyard with its mural crosses attracted attention, especially when the bell tolled. There was a forest of real trees, and a noble landscape representing a scenic view of the Ural Mountains.

There was no sham about this village, for the logs of wood were imported from Russia. The tiles came from the same country, and even the nails that held the logs together were of Russian manufacture, and there was Russian painted glass in the church nearly three hundred years old. The goods shown in the village were interesting, for they included dry goods, leather work and horn implements. There were Russian furs and Loukoutin enamels, and Russian white metal and cast-iron work. By such means the English people are kept in touch with the architecture of the world, for the village at last year's exhibition was Dutch. Perhaps next year it may be American—who can tell!

New Style of Dormer Casement Window

For the special purpose of providing a cheap form of dormer window for workmen's houses and small cottages and which can be placed on a roof as easily



A New Style of Dormer Casement Window

as an ordinary skylight, a member of a firm of architects in Edinburgh, Scotland, has devised the construction which we illustrate herewith.

This window, it will be seen, gives the advantages of light and air of a skylight and the appearance of a dormer window at a comparatively small cost. The casement window is made of cast iron and is fixed in the same manner as a roof light, the slates or tiles going over the top and sides and under the bottom frame in such a way that any ordinary mechanic can put the window in place. There are two sizes, one measuring 16 in. by 25 in. and the other 32 in. by 25 in. and known as single and double dormer windows. They are fitted with casement sashes hinged at the sides and opening outwards with regulating quadrants and constitute strong, durable and watertight dormer windows.

New York's Buildings Sufficient for Present Requirements

In speaking of the building situation in New York City the official of one of the large lending institutions, whose opinion was sought as to the outlook for the mortgage market, said: "New York City can stand curtailment in new buildings of all descriptions

for a year at least and in some directions longer. Real estate requires a rest. Yes, even after the spell of comparative cessation in construction a Sabbatical year would be an effectual dose, one, indeed, that would cure the market of its most serious defects.

"There are still too many office and loft buildings to warrant money lenders to loosen their purse strings, although it does look at the present time that in the latter case there will presently be a different feeling. The commercial structure which has been so abundantly built in the last two or three years as a result of the uptown movement, is gradually being absorbed by tenants. In fact, this sort of realty is now in favorable shape and by February of next year, when the renting season closes, the situation should show even more improvement, as the demand for commercial space has been brisk."

Meeting of Building Trades and Employers' Association

The annual convention of the National Building Trades and Employers' Association will be held in the city of Louisville, Ky., January 21, 22 and 23 of the coming year. National Secretary I. H. Scates is making preparations for a large attendance, as matters of great importance will be discussed.

A day or two prior to the national convention the secretaries of the various Builders' Exchanges will hold a meeting similar to that which occurred in Detroit in September 1912. Charles A. Bowen, secretary of the Builders' and Traders' Exchange of Detroit, with headquarters in the Penobscot Building, is the originator of the idea and through his efforts the meeting there held, which was the first of its kind, was a great success and of inestimable value to the visiting secretaries. On the strength of that meeting it is expected to have an equally successful convention in Louisville in January 1914.

New York State Building at Panama Exposition

The New York State Building which will be erected at the Panama-Pacific Exposition to be held in San Francisco, in 1915, will be at the head of the State Reservations and will occupy a plot 220 x 350 ft., almost adjoining the Fine Arts Palace of the Exposition and facing immediately on the Marina, which is to be the main thoroughfare bordering on all the exhibit palaces, the state reservations and the parade grounds, connected with the Presidio Military Reservation.

The plans, which have been prepared by Charles B. Meyers, 1 Union Square, New York City, call for a building which architecturally follows the modern classic idea with Greek influence. The structure will be 248 ft. long, 77 ft. wide and 60 ft. in height, divided into three stories. Stone and brick such as New York state produces will enter into the construction. The remainder will be of plastic composition in imitation of Italian stone. The structural frame will be of timber carried to spread-timber foundations in the sandy soil.

Supporting the big portico of the main entrance, above which the coat of arms of the State of New York will be emblazoned in heavy relief, will be half a dozen Ionic columns of large size and smaller columns of the same character will be used to support the verandas at either side of the main entrance.

On the first floor, through the center of which will be a corridor 16 ft. wide the entire length of the building, will be a large assembly hall, reception, writing and retiring rooms for men and women, an information bureau, post office, telegraph and telephone booths, parcel rooms and restaurant. The assembly room will

measure 36 x 53 ft. in size. The rooms will be reserved for the use of New York State visitors and exhibitors. Files of the New York State newspapers, railroad time tables, hotel data and information of all sorts will be available for all comers.

Building Concrete Block Partitions Is Bricklayers' Work

The differences which existed between operative bricklayers and operative plasterers thereby disorganizing building operations in the Liverpool (England) district for something like ten weeks has been settled by the arbitrator appointed by the Board of Trade. The dispute arose in connection with the Adelphi Hotel contract as to whether the placing or fixing of concrete blocks for partition work should be done by the bricklayers—as being in substitution of brick work—or by the plasterers, as being equally in substitution of lath

They have been finished in white marble and fitted with most modern plumbing appliances.

A rest room for women is furnished with chairs and couches, and the women's station will be in charge of a matron from 8 a. m. to 11 p. m. Towels, soap, brushes and combs will be found in both stations free of charge. The men's station will be open at all hours day and night.

With the opening of the new stations Allegheny County will have four public comfort stations in use in Pittsburgh, two on the Federal Street Bridge and the courthouse station.

A Log Cabin Built by a Woman

We take pleasure in presenting herewith a general view of a rather unique log cabin which for the most part was built by Mrs. J. B. Osthoff, who is seen seated upon the porch. It will be observed that the lower



A Log Cabin Built by a Woman in the Rear of Her Suburban Residence in Cincinnati, Ohio

and plaster partitioning. Neither side would give way and as they could not agree to a workable compromise the bricklayers struck.

Finally, however, the parties agreed to refer the dispute to a Board of Trade arbitrator, who, after duly considering all the points involved, decided that "it is the bricklayers' work to build or fix rough concrete blocks for partition work."

Public Comfort Stations in Pittsburgh

Two new public comfort stations installed by the county commissioners at the Allegheny County courthouse in Pittsburgh on either side of the Fifth Avenue entrance have been opened for public use. There are two rooms provided, one for women and one for men.

portion of the walls are of cement, while the portion directly below the eaves is of logs.

Log cabins of the character here shown are all the rage just at the present time in and about the city of Cincinnati, and the cabin here illustrated was built in the rear of the owner's suburban residence.

A Nuremberg church seating 1,200 has an electric heater for each pew. A 3-inch iron tube encloses a small tube wound with resistance wire, and this heater runs in front of the seat and along the back of the pew ahead. Each heater has its own switch.

There are 55 oaks in the United States, about evenly divided between east and west. The eastern species and particularly white oaks are the most valuable.

Convention of American Institute of Architects

Official announcement has been promulgated that the forty-seventh annual convention of the American Institute of Architects will be held December 2 to 4 inclusive in the city of New Orleans, La., with headquarters at the Grunewald Hotel.

Secretary Glenn Brown has issued the following program:

TUESDAY, DECEMBER 2.

(1) Morning Session, 10 o'clock.

1. Members of the Institute will meet on the first floor of the Grunewald Hotel, at 9.30 o'clock.
- (a) Register their names.
- (b) Address of welcome to the State by Hon. Luther E. Hall, Governor of Louisiana.
- (c) Address of welcome to the City by Hon. Martin Behrman, Mayor of New Orleans.
- (d) Address of the President, Mr. Walter Cook.
- (e) The President will announce the following committees, to whom addresses and reports will be referred:
 - Committee on Credentials of Delegates.
 - Committee on President's Address.
 - Committee on Report of the Board of Directors.
 - Committee on Reports of Chapters.
 - Committee on Reports of Standing Committees.
 - Committee on Reports of Special Committees.
 - Committee on Resolutions.

In order to expedite matters, those having resolutions to offer are asked to prepare them ten days in advance, and submit them to the Secretary to be forwarded to the Chairman of the Committee on Resolutions. This will not prevent the offering of resolutions upon the floor.

(f) Convention declared open for business.

2. Report of the Board of Directors.
3. Report of the Treasurer and Auditing Committee.
4. Reports of Chapters, a synopsis by the Secretary.
5. Reports of Committees.

Standing Committees:

- (a) On Contracts and Specifications, Grosvenor Atterbury, Chairman.
- (b) On Allied Arts, Thos. R. Kimball, Chairman.
- (c) On Government Architecture, J. H. Rankin, Chairman.
- (d) House, Leon E. Dessez, Chairman.
- (e) On Education, C. C. Zantinger, Acting Chairman.
- (f) On Competitions, M. B. Medary, Jr., Chairman.
- (g) Nominations sent to the Secretary by Member of the Institute.

Special Committees:

- (h) Relations of Chapters to the Institute, Irving K. Pond, Chairman.
- (i) Conservation of Natural Resources, Cass Gilbert, Chairman.
- (j) Delegates on Testing Material, A. O. Elzner, Chairman.
- (k) On Electrical Code and Fire Protection, Julius Franke.
- (l) On Fire Protection, F. H. Wentworth.
- (m) On International Congress of Architects, Walter Cook, President.
- (n) On Town Planning, H. V. B. Magonigle, Chairman.
- (o) On Legislation, L. C. Holden, Chairman.
- (p) On Schedule of Charges, I. K. Pond, Chairman.
- (q) On Government Competitions, John Hall Rankin, Chairman.
- (r) On Public Information, D. Knickerbacker Boyd, Chairman.
- (s) To Confer with the National Association of Master Plumbers, D. Everett Waid, Chairman.
- (t) On Quantity Surveying, Sullivan W. Jones, Chairman.
- (u) On the Architects' Bureau of Technical Service, Frank Miles Day, Chairman.

(2) Afternoon Session, 2 o'clock.

1. Reports of committees not presented at the morning session.
2. Amendments to the Constitution presented.
3. Amendments to By-Laws presented.
4. Discussion on the Amendments.

The meeting to adjourn at 4:30.

The members and their friends are invited to a Tea at Newcome College—Art Department—from 5 to 6 o'clock.

WEDNESDAY, DECEMBER 3.

(2) Morning Session, 10 o'clock.

1. Report of Committee on Credentials.
2. Vote on Amendment to the Constitution and By-Laws.
3. Reports of committees appointed at the first session and their consideration.
 - (a) On the President's Address.
 - (b) On the Report of the Board of Directors
 - (c) On the Reports of Chapters.
 - (d) On the Standing Committees' Reports.
 - (e) On the Special Committees' Reports.
 - (f) On Resolutions.
4. Presentation of a proposed law to control the Government Fine Arts.
5. Unfinished business.
6. Miscellaneous business.

(4) Afternoon Session, 2 o'clock.

1. Committee Reports: Discussion continued.
2. New Business.
3. Election of Officers. Polls open from 3 to 5 P. M.

Evening, 8 o'clock.

Reception to Members of the Institute by the Louisiana Chapter to meet citizens of New Orleans. Two addresses on the question of Government Fine Arts by Mr. Henry P. Davis and Mr. John M. Parker. The public invited by card.

THURSDAY, DECEMBER 4.

(5) Morning Session, 10 o'clock.

1. Report of Tellers on the election of officers.
2. The principal topic of discussion on this occasion will be the Status of Government Fine Arts.
3. Unfinished business.

(6) Afternoon Session, 2 o'clock.

Visit to points of interest in New Orleans.
Seeing the Port of New Orleans and an excursion, by water, to a typical plantation home near New Orleans.

Evening, 8 o'clock.

Banquet.
Among the speakers upon this occasion will be Mr. R. B. Mayfield and Geo. H. Terriberry.

Excursions.

Members of the Louisiana Chapter will conduct visiting architects to the principal points of interest, most of which are near the hotel, each morning starting at 8:30 and returning in time for the meetings at 10:00 o'clock.

Members of the Institute have been invited to view the new buildings of the Rice Institute, Houston, Texas, after the Convention. All who desire to take advantage of this invitation are requested to notify Mr. Wm. Ward Watkin, Houston, Texas.
The Architects' League of Memphis (Tenn.) invites the visiting Architects to spend Saturday, December 6, 1913, in Memphis as their guests.

Those who desire to make a side trip to Panama will have the opportunity, as boats leave every Wednesday and Saturday. Fare, including meals, \$95 to \$100.

Building Operations in Queens Borough, N. Y.

The report made public a few days ago by John W. Moore, Superintendent of the Borough of Queens, N. Y., strikingly indicates the rapid growth of that particular section of Greater New York. The report covers the first nine months of the year and shows that 3,587 plans for new buildings were filed representing a total estimated cost of \$13,389,396. The growth since the first year of consolidation has been nearly 600 per cent., and one of the reasons for the marked increases recently has been the assurance of early rapid transit for the Borough.

Superintendent Moore has inaugurated a system in the department by which each plan as received is numbered in numerical order and entered upon a daily schedule in order to make it more convenient for compilation. One of the beneficial results of this plan is that favoritism among builders is eliminated and it also results in facilitating the work of the examiners.

Architects' License Law in Iowa

At a recent meeting of the Iowa Chapter of the American Institute of Architects held in Des Moines, the Chapter went on record as being opposed to the practice of competitive drawings, but favored the employment of an architect direct. The members also were in favor of a law for licensing architects.

One of Chicago's citizens has contrived a cement ash box. The ashes are dumped through the opening on the top, ordinarily kept closed by means of a sheet iron door. The box side is flush with the outside of the fence, and in this side is another sheet iron door on stout hinges. The ash man simply opens the side door and shovels the ashes into his wagon. The bottom of the box is also of concrete, the whole contrivance being stationary.

Builders in Newark, N. J., have been very active recently in filing permits for frame houses, as the construction of them will be prohibited within the fire limits of the city after the first of January, 1914.

TYPICAL COUNTRY PLUMBING INSTALLATIONS

The Plumbing in a Cottage of Moderate Cost with Unnecessary Features of Ventilating and Waste Pipe System Eliminated

THE question to be considered chiefly in designing the plumbing equipment in a cottage where city regulations do not enforce strict obedience to certain requirements in construction is that of economy. The word economy must not be construed to mean mere cheapness, however, but should rather spell efficiency at the lowest cost.

To secure this efficiency the method of construction adopted should be such as to simplify the piping layout while not sacrificing any of the safeguards that must be provided against the entrance of sewer air, the proper working of the system and the easy upkeep of the fixtures. In other words, it should be ascertained what can be done without as well as what must be done.

The price that the customer is willing to pay must in a measure determine the quality of the work, but it should never limit the safeguards that must be included in the design. The accompanying illustration of a typical installation of plumbing in a two-story and basement cottage may illustrate this clearly.

No account need be taken of the quality of the fixtures in this connection. It is clear that these should be of the best quality consistent with the use to which they are to be put, the design of the rest of the building and the tastes of the owner. The long service given by a good grade of material dictates that real economy is secured in the end when a fair price is allowed for this part of the work.

In the construction of the soil and vent piping, however, it is quite possible to make some saving over the cost of installing a similar number of fixtures in a larger building. In the first place, there is less possibility of siphoning fixture traps in a low building than there is in a high one with other fixtures draining into the same soil pipe at a higher level, and therefore much of the venting that is absolutely necessary in the large building cannot only be safely omitted, but the job will be really more efficient without it. This saving is only secured with safety when the design is well worked out, however, and a study of the illustration will show this.

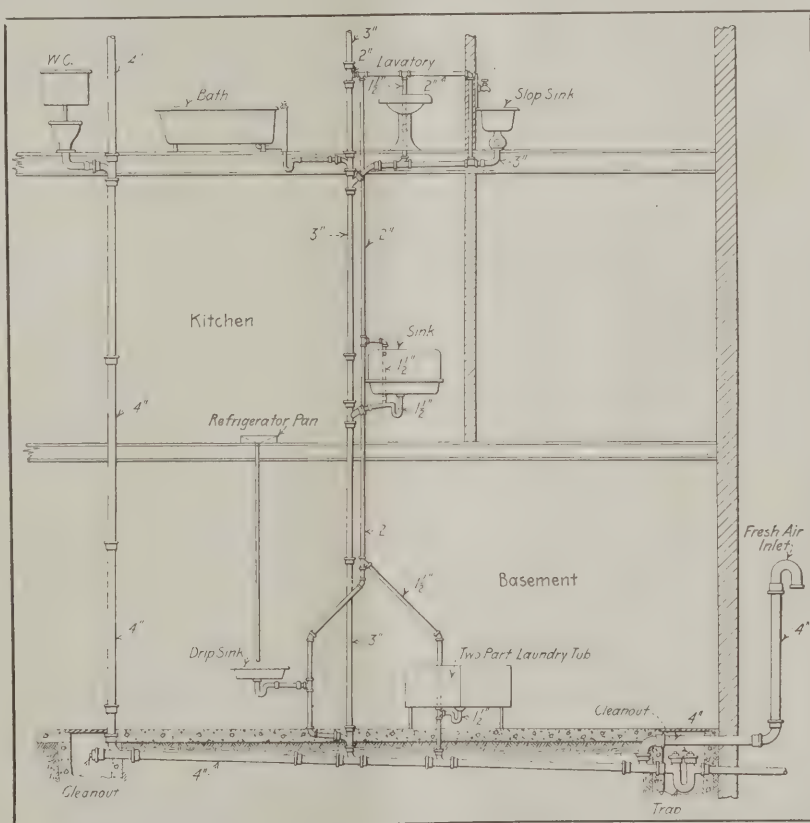
In the first place, the illustration shows a house trap

with a fresh air inlet installed in the same manner as it would be in a large building. If the house drain does not deliver into a sewer, but is connected to a septic tank or to a private drain delivering into a brook or pond, as is common in country districts, this trap may safely be omitted. In fact, if a septic tank is used and no means of venting the pipe between the house trap and the inlet to the septic tank is provided, it is conceivable that an obstruction to the flow would be made by the air trapped in the part between the seal of the house trap and the submerged inlet to the septic tank.

The advisability of leaving the trap off where a connection is made to a public sewer is open to question.

There are good arguments on both sides, but an effective one against the discontinuance of the trap is offered when it has been found that in extremely cold climates the public sewers have become frozen by the excess of cold air allowed to pass through them by the great number of open ends afforded by the untrapped house drains.

Taking the internal construction of the plumbing, it will be seen that with the fixtures placed as in this house it is more economical in every way to erect two soil stacks than one. By doing this the branches to the



Typical Country Plumbing Installations—Elevation Showing Arrangement of the System

fixtures are short and the number and length of the vent pipes and branches are reduced to the minimum.

Two of the fixtures, namely, the bath tub and the water closet, having no waste connection entering the stack above them, may safely be left without any revent connection, and in both cases the fixture traps are within safe distance of the vertical main vent stack. For a house of this size a 4-in. house drain will give good service. The house drain may be installed so that it will run above the cellar floor and still drain the laundry tubs or other fixtures in the basement if these fixtures are rightly placed or if they are on a platform raised a little above the floor level.

If the floor is of concrete and it is necessary that the pipe be run beneath it, a bricked up trench should be provided if the appropriation will admit of it. If not, the trap and cleanout at least should be accessible through brick pits with iron or wooden covers and

there should be as few bends under the floor as possible. If a branch fitting can be used to make a turn instead of a bend, then a cleanout may be calked in the end hub and access will be easy to clear the pipe of grease or other obstruction should it ever occur. In the event of such cleanouts being provided it should be endeavored to place them where other fixtures, heating furnaces, coal bins or partitions will not interfere with the means of access.

The Riser Connections

The riser connections should be made either with Ys or long pattern T Ys. The first are preferable, and to bring the pipe to the required position a $\frac{1}{8}$ bend may be calked into the branch of the Y. The standard size of pipe to use for the water closet stack is 4 in., but on occasion it may be advisable to use 3-in. pipe here. In the case illustrated the pipe is without any lateral change in direction, and there are no other fixtures to take care of. Therefore, it would in most cases be perfectly safe to use 3-in. pipe if it was advantageous to do so for any reason connected with the building construction. Such reasons may be strong if to accommodate the 4-in. soil pipe a box has to be constructed or a partition of special width erected. Economy may also be effected in such cases by making the pipe of galvanized wrought iron rather than of cast iron. There will be fewer joints to make and the pipe will occupy less space than one of the same diameter in cast iron will.

The diameter of the pipe necessary to serve the bath tub, sink, lavatory and slop sink is 3 in. This may be made either of cast iron or wrought iron at the option of the plumber. The cast iron is somewhat easier to install where there are so many inlets to the vertical pipe and for this reason it may be preferable, as the quality of the two is on a par for work of this class. The branches to the fixtures should be made through sanitary tees. The space between the floor and the ceiling will not as a rule permit of Ys and $\frac{1}{8}$ bends being used, but the sanitary tees will give satisfactory service in this position.

Traps To Be Vented

It is necessary to vent the traps of the drip sink, the laundry tubs, the kitchen sink, the slop sink and the lavatory. In a 3-in. pipe the discharge from a slop sink or a bath tub is sufficient to fill the vertical pipe with a swirling column of water which exhausts the air very completely and therefore there is a vacuum formed behind the falling column which would unseat the traps in quick time if means were not provided for the easy replacement of the air exhausted. The same care must be observed to protect the seals on the drain side of the descending column of water, but in this case the air in front of the column is being compressed and must find outlet somewhere. If there are no open ends and if the length of the house drain is considerable to the fresh air inlet or to the open end at the sewer or septic tank this pressure will probably be sufficient to blow the water out of the fixture traps. Therefore it will be seen that it is not possible to entirely eliminate vent pipes, although these may be simplified as much as possible.

The elevation shows that the laundry tubs have been connected to the horizontal 4-in. pipe under the basement floor, and that the drip sink trap discharges into a sanitary tee at the base of the 3-in. stack. As it is desirable that a vent stack should have a connection with the soil pipes at its base it is therefore economical and also first-class practice to use the vent of the drip sink as the lower part of the vent line for the other fixtures. The vent from the laundry is easily connected through a 45-deg. branch fitting so that no rust may collect in it and then the vent pipe is continued upward to receive the kitchen sink vent connection.

The waste line of the top sink is of 3 in. diameter, and it is probably best to make this of wrought iron, connecting the slop sink with a lead bend connected to the wrought iron by means of a brass screwed nipple. It may be well to mention that the fitting known as a brass waste bushing is convenient to use for such connections and the lead pipe may then be passed through it so that there is no brass exposed to the action of the water or waste matters passing through it.

A 3-in. x 2-in. tee screwed on the end of the wrought iron pipe may be used satisfactorily for the vent connection, and as the lavatory trap will be vented on the continuous plan the waste pipes may be put right in and the vent pipes connected to the stack at a level high enough to insure that no waste water can pass through them in the event of the regular path being obstructed. The plan shows the vent pipe carried to a level above the top of the lavatory, but in some cases it may be advisable to keep this down so that any water backing up in the vent pipe would be noticed before it could pass to the waste stack through the vent connection and yet the fixture could not overflow. This, however, is a detail which may be overlooked without much harm in a single house, as there would be little chance of continued use of a fixture at a level high enough to cause an overflow when it was known that the use would cause a nuisance at a lower level.

The Bath Tub Connection

The bath tub connection is made to the 3-in. stack through a regular half S trap. There is no need for reventing here any more than there is at the water closet, as the fixture is the highest on the line. It will be necessary to make connections between the various vent pipes and fixture traps at one or more places with right and left couplings or with unions. If unions are used those with ground metal faces should be selected. On no account should a union with a lead or soft packing be selected, as there will be a liability to leakage should the packing shrink. The vent stacks, after the top connection has been made, should be carried through the roof in as straight lines as possible, and so that they discharge at a point above any windows or roof openings and far enough away from them to avoid any chance of odors being blown into the rooms.

If nickel-plated traps are used at the lavatory, sink and laundry tubs, the connection to the wrought-iron tee should be made by means of a brass bushing. If the traps are heavy enough they may be threaded and screwed into the bushing in the same manner as a piece of pipe, but if not then the end of the trap should be carefully tinned and the bushing connected to the trap by sweating the connection full of soft solder. Slip joints on the drain side of a trap should never be used, as it is only a question of time before the packing will dry out and allow a leak of drain air to occur.

The Refrigerator Pan and Connection

The refrigerator pan may be made of wood and about 1 ft. square. It should be constructed so that it will have its outlet at the center with a sharp pitch from the sides, so that the walls of the box must be from 2 to 3 in. high. The connection may be made to the copper or lead lining with a piece of lead pipe and a brass solder nipple at the end of the pipe may be connected to a wrought-iron pipe which can deliver over the top of the drop sink in the basement.

The drip sink need not be large, but should be firmly attached to the wall at a height sufficient to secure a good connection to the waste pipe. A sink of galvanized cast iron will give first-class service for this purpose. The trap may be $1\frac{1}{4}$ in. in diameter if desired, but preferably should be $1\frac{1}{2}$ in. The waste from the pan may be 1 in. in diameter and if any turns are necessary cleanouts should be used.

The water supply to the fixtures must be proportioned according to the pressure available. If it is at all high a pipe of $\frac{3}{4}$ in. diameter will probably supply all of them abundantly. It may be carried up alongside of the 3-in. waste pipe and the branches to the various fixtures connected under the floors, or if a separate control for each fixture is desired separate branches may be taken up from the basement. The latter is the more expensive way, but if a water table is used it gives the owner complete control over all of the fixtures and there is little chance of the wrong stopcock being closed if all are together on a board and properly tagged. When pipes are laid under floors that would cause damage and expense to take up for any repair it is well to make them of brass. Then they are at least immune to a great extent from filling up with corrosion as iron pipe sometimes does. If the appropriation will admit it, control valves should be placed on all of the supplies to the fixtures. Angle valves on the lavatory supplies and neat compression

valves with wheel handles on the closet and bath tub supplies look well and afford a ready means of regulating the flow to a desirable point, as well as of closing the supply when repairs are necessary. The hot water supply in such a building is a simple affair, and generally consists of a pipe taken from the top connection of the boiler placed in the kitchen and then following the line of the cold water pipes to the fixtures.

As the runs are invariably short, little is to be gained by making a circulating loop, and when this is done it merely consists of connecting a pipe at the most convenient place at the last fixture, taking care that there are no low spots in the piping and providing for the escape of air by connecting the said fixture so that the air will escape each time water is drawn. Then the circulating pipe is carried down to the kitchen and connected to the lower tapping of the boiler or to a tee on the return connection to the kitchen range. The circulating pipe may generally be made one size less than the supply with advantage.

LIGHTING COUNTRY HOMES BY ACETYLENE GAS

Various Types of Acetylene Generators—Some Interesting Particulars
Telling How Acetylene Is Produced

IT is a well known fact that, although the great majority of people living in the country or in the smaller cities know what acetylene is and how beautiful a light it produces they do not exactly understand how it is generated.

Acetylene gas has been known to the chemical world for a number of years, but it remained for an American chemist—Thomas L. Willson—to discover how to produce it in commercial quantities.

Mr. Willson in 1892, discovered entirely by accident that an amalga-

tion of lime and coke produced calcium carbide, the contact of which with water produces acetylene gas.

This is the simple process of generation, the bringing together of water and calcium carbide, therefore anyone can make acetylene gas.

The difficulty has been, first, to cleanse it of impurities obtained from the lime and coke—that is, lime

dust and soot, and so filter and cleanse it that the flame at the burner would be the pure golden white, utterly without unpleasant odor or impurity, which renders acetylene so popular for lighting beautiful homes. An example of a building lighted by acetylene gas is presented in Fig. 1 of the illustrations.

There are two types of acetylene generators, the first of which feeds a small quantity of water to a large quantity of carbide, and the second and better type feeding a small quantity of carbide to a large quantity of water.

The objection to the first type, called water-feed generators, is that the gas they produce cannot be prop-

erly washed and filtered, on account of the small quantity of water. This produces a hot, impure gas, which has a tendency to carry the lime-dust and soot to the burner tip, causing it to clog and sometimes dirtying the near-by walls.

In the better type of acetylene generators, called carbide-feed, a small quantity of carbide is dropped into a large quantity of water. The dropping of the carbide into the water chamber is called "feeding" and this is done in various ways.

The generator itself consists of the water chamber and the various devices for washing and filtering the gas, into which is set a bottomless tank called the gas-bell. The feeding device is connected to the gas-bell so that its rise and fall will operate the feed.

For instance, as the gas in the bell is burned in the jets, the gas-bell naturally falls.

This operates the feed-device, either

directly, as in some machines, or indirectly, as in the Davis Generator, dropping a small quantity of carbide into the water. This generates gas, which immediately raises the gas-bell. When, in turn, this gas is burned, the gas-bell again sinks. The feed is again operated, the gas generated, and the bell rises just as before. This is a perpetual operation and the feeding is entirely automatic, requiring no attention from the user.

The gas rises to the gas-bell and is conducted from there through to the small box filled with water, called the washing chamber. Rising from there it passes through a second washing chamber and again through



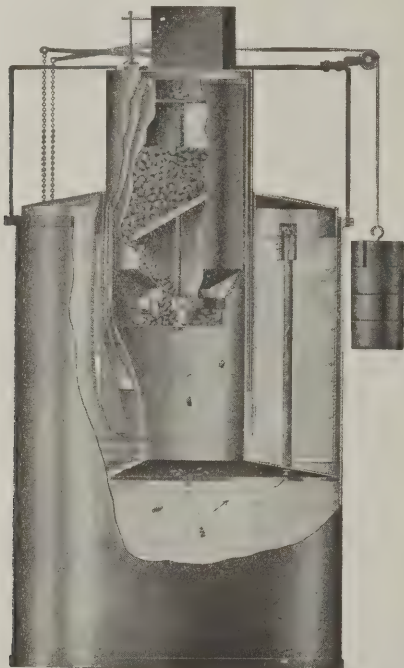
Lighting Country Homes by Acetylene Gas—Residence of Gen. John W. Kearney at University, Va., Lighted by this Means

a filter composed of many thicknesses of felt, which absolutely removes all impurities from the gas.

This, in brief, is the way in which acetylene generators work. We have paid some slight attention to the difference in various feed devices—that is, direct or gravity feed, and indirect or forced feed.

A device now on the market covering this forced feed is used in the Davis Generator shown in Fig. 2. The difference between it and other feeds is that where other gas-bells operate the feeding device directly by the rise and fall of the gas-bell, the gas-bell in the Davis Generator simply releases a clock-work motor, which in turn, revolves a disk upon which rests a small portion of the feed in the hopper. This disk revolves and one or two lumps of carbide are pushed into the water. As soon as they strike the water more gas is generated and the gas-bell rises, causing the clock-work motor to cease revolving and, therefore, the machine stops feeding.

This idea permits of the use of lump carbide, as distinguished from the quarter-inch size, (screenings)



Lighting Country Homes by Acetylene Gas—Sectional View of Gas Generator Showing Internal Arrangement of the Various Parts

used in other machines. As one may readily understand, the lump size contains more gas to the pound than the fine-crush.

This clock-work motor feeding device also permits of the use of many devices which are not possible in the ordinary direct-feed generators' device, entailing economy, as, for instance, the prevention of the waste of gas by escape through the blow-off pipe.

The Davis Generator was invented in 1900, and has now been on the market for nearly 15 years. It is used in the homes of many prominent men and the United States Government uses it in many of its Indian Schools.

The Davis Acetylene Company, 181 Crawford street, Elkhart, Ind., has a special proposition for contractors and builders. It is especially good because the busy season of acetylene installations falls at a time when work is rather dull with carpenters and builders. In addition, there is no reason why the carpenter-contractor should not provide for the use of Davis Generators for lighting, when erecting a new home. The company claims to have records of several contractors and builders who have entered their selling force with marked success. They have a good selling plan and are very anxious to add a few well-recommended carpenters

and builders to their list. The business requires no capital, as orders can be taken direct for the Davis Acetylene Company and commissions paid to the salesman. This offers a very profitable proposition for builders and contractors especially, not alone in the busy season, but in the time when they are idle.

San Francisco Building Material Market

Our San Francisco correspondent writing under date of November 7 says:

Building has no doubt been somewhat retarded this fall by the downward tendency in the price of many building materials, but it is now believed that the lowest level, in most lines, has been reached. While all steel products have declined, the cut in some lines of most importance in building has been more radical than at most eastern points, owing to the new tariff. Both reinforcing and soft steel bars have dropped sharply and there is no doubt that such materials will be imported in considerable quantities. Plain structural material also is considerably cheaper, and some local fabricators had considerable material in bond when the tariff bill was passed, while others are making a careful comparison of prices quoted in different quarters. Further changes may take place when the foreign steel now under contract begins to arrive.

The lumber market, which opened the year at high prices, has been compressed for several months, and a recent improvement in demand has brought no firmness as to prices, which are said to be about at cost of production. Lumber freight rates from the Columbia River and Puget Sound are also very low, about \$3 per M. to San Francisco. In view of a reviving foreign trade, lumbermen are beginning to predict an advance early next year. Redwood shingles have advanced a little and are firm, with many mills closed; but cedar shingles are unusually cheap. It is said that shipments of British Columbia cedar shingles into the United States have doubled since the removal of the tariff.

The brick trade has been quiet all season, and the price of common recently dropped from \$7 to \$6.50. The yards are carrying heavy stocks, which are being reduced by frequent shipments to coastwise points and the Hawaiian Islands, while some plants have shut down. Some large contracts have been let, however, on which delivery will begin about February, and with other good business in sight a firmer market is expected after the first of the year.

Brick Construction in Boston's Suburbs

In connection with the proposed extension of the fire limits of the city of Boston, it is interesting to note the evident tendency in the districts involved to an increased use of brick. In East Boston, for example, the amount of new construction during 1911 and 1912 was of the value of \$1,506,000, of which \$720,000 was of brick, but with the buildings contemplated in the not distant future the use of brick will constitute over 50 per cent. In Charlestown, with a value of buildings two years ago amounting to \$16,272,000, the increase has been \$1,054,000, about 80 per cent. being of brick. Of the 20 per cent. wood over three-quarters was for repairs, showing where the principal deterioration takes place.

South Boston's increase on a basis of \$27,382,000 was \$3,116,000 or about 11 per cent. Ninety-five per cent. was brick and only 5 wood—a large feature of the latter being repairs. Over 70 per cent. of the \$3,000,000 increase in Roxbury was of brick. The increase in Brighton has been about 15 per cent. on a basis of \$17,487,000; and of the \$2,620,800 new growth \$1,630,750 has been of brick and \$990,060 of wood.

CURRENT NEWS OF BUILDERS' EXCHANGES

Meetings and Elections of Officers of Various Bodies—A New Association in Michigan—A Better Buildings Exposition

Meeting of Cleveland Builders Exchange

The annual meeting of the Cleveland Builders Exchange was held Wednesday, November 13, at the Hollenden Hotel in that city. The meeting closed the twenty-first year of the Exchange and in connection with the gathering there was a banquet and speechmaking. President George A. Rutherford, in reviewing the work of the Exchange during the year, called attention to the fact that a number of the city's largest building contracts had gone to builders in other cities and urged a strong civic spirit on the part of those controlling the awarding of large contracts and that where differences are not too great the contracts be awarded to Cleveland concerns.

He referred to the attention which is now being given throughout the country to better estimating methods in the building business; also to the steady progress which is being made in the movement to eliminate the risk arising from errors and omissions in estimating of quantities, resulting in an effort to establish a national organization to promote estimating upon a fixed and specific basis of quantities to be furnished each bidder similar to the method now prevailing in England. To this end it has been suggested that chapters of this national organization be established in the large cities to be composed of architects, engineers and contractors who shall put into effect this system of figuring.

Another matter which President Rutherford touched upon and one which is of direct and important interest to all employers is the Green Workmen's Compensation Law which becomes effective on the first of January, 1914, and imposes severe penalties on those who omit to comply with its provisions. As those who do not comply with the law are left practically defenseless, he pointed out that it is incumbent upon all who would avoid this situation to act without delay. Many of the building firms have already adjusted this matter and will avoid the rush at the first of the year. Under the new law an incentive is given for the study of safety methods and the president expressed the belief that all the trades would do well to undertake investigation of ways to reduce accidents as a direct result of which will come reductions in premium rates.

The president called attention to a new departure in the Exchange, and one which is meeting with popular favor, and that is the starting of a class of young men in the study of concrete construction. This school is conducted in the Exchange rooms and a series of twenty evenings has been decided upon for the term. The instructor is Sam W. Emerson, a practical contractor with college and engineering training, who has prepared a course including both work in the office and in the field calculated to give the young men enrolled in the class a knowledge of the subject both theoretical and practical. If the undertaking proves successful in its permanent results other classes may be established later on to take up a similar work in other lines of the building industry.

The president concluded his address with brief reference to the series of reports on current building operations which are sent to all members once each week and to the work which has been done in connection with a revision of the Building Code of the city. The latter subject is likely to be one of the live topics at the next convention of the Ohio State Association of Builders Exchanges to be held early in the new year in the city of Toledo.

At the conclusion of his address Mr. Rutherford turned the chairmanship of the meeting over to A. C. Klumph, one of the directors. Talks were made by Ernest Ashton, consulting engineer for the Lincoln Memorial Highway; George Schneider, secretary of the Cleveland Athletic Club; Virgil D. Allen, city building inspector, and W. A. Bohnard, president of the Cleveland chapter of the American Institute of Architects.

Directors were chosen to serve the following year as follows: Ford Donley, Sam W. Emerson, Fred Epple, Ira C. Farley, W. A. Fay, L. A. Griffin, A. C. Klumph, George A. Rutherford, Gustav Schneider and Henry Watterson.

At the annual meeting of the directors held November 13 George A. Rutherford was re-elected president; A. C. Klumph was elected vice-president; Henry Watterson was re-elected treasurer; E. A. Roberts was re-elected secretary, and Charles E. Jameison was elected assistant secretary.

Associated Builders' Exchanges of Michigan

The Builders and Traders' Exchange of Michigan met November 11-13 in convention at Grand Rapids and formed an association to be known as the "Associated Builders' Exchanges of Michigan." A constitution and by-laws were adopted and officers were elected as follows:

*President.....*W. F. Wiselugel of Muskegon
*First Vice-Pres....*Chas. H. Bryan of Detroit
*Second Vice-Pres.*David Little of Kalamazoo
*Third Vice-Pres....*O. J. Nickols of Lansing
*Secy. & Treas.*A. H. Shank of Grand Rapids

The Association will be incorporated under the laws of Michigan just as soon as practicable.

Better Buildings Exposition

The first of a series of Better Buildings Expositions was held at the rooms of the Builders' and Traders' Exchange, Columbus, Ohio, October 21. Lantern slides of photographs of the most beautiful residence work in the city, were exhibited, each architect submitting what he considered his two best pieces of work. The meeting, which was preceded by a banquet, was a great success. Practically every architect in Columbus submitted photographic slides, and as they were shown on the screen by Prof. Bradford, dean of the architectural department of the Ohio State University, each architect arose and described the building, stating also when it was erected, the cost and the name of the owner.

Another exposition was held in November, when public buildings in Columbus were the subject of the slides. Material dealers and contractors also showed some slides indicating artistic effects in their work, also durability and practicability.

The Columbus Exchange is said to have been the first to have for free distribution the new affidavit forms which are to be used in accordance with the new mechanics' lien law in Ohio which went into effect August 6. Most of the contractors are giving bond instead of using the somewhat tedious performance of filling out the affidavits.

New Offices for Vancouver Builders' Exchange

The Builders' Exchange which was recently organized at Vancouver, B. C., has opened offices in the Fairview Building, occupying rooms No. 45 and 46. It is the intention to have in the near future an entire floor in some building where the Exchange can establish a permanent exhibition of builders' supplies. The officers which have been elected are:

*President.....*A. K. Bentley
*Vice-President.....*William O. Marble
*Secretary.....*W. H. Lindsay
*Treasurer.....*H. N. Boulton

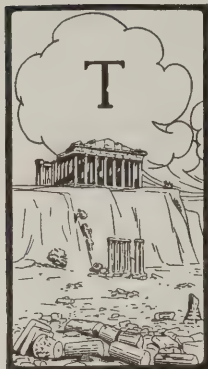
The officials have in mind the establishment in the near future of a 'Change hour and other steps will be taken to place the organization upon a substantial and progressive basis.

At a recent meeting of the Builders' and Traders' Exchange of Milwaukee, Wis., the members participated in a general discussion of the workmen's compensation law, the lien law, and the apprenticeship law as applied to contracts. One of the interesting speakers of the evening was Senator Wilcox of Appleton, Wis.

A somewhat novel use of ferro-concrete is represented by the two ventilation shafts recently built at the new slaughter-houses for a Glasgow Corporation. The shafts are 45 ft. high by 2 ft. 9 in. square inside, from top to bottom. The sides are 4 in. thick at the bottom and 3 in. thick at the top, the concrete being reinforced by thin rods disposed horizontally and vertically every few inches.

A BRIEF REVIEW OF THE BUILDING SITUATION

Figures Showing Building Activities in Leading Centers Based on the Value of Permits Issued in October, 1913, and October, 1912



THE difficulty of making building loans, due to the attitude of lending institutions, exercised a depressing effect upon the building situation in the country during the month of October, 1913, with the exception of the north central section of the United States, which seems to have resisted successfully the effect of this adverse factor. As might have been expected, the effect of this condition is reflected in the East to a greater extent than in any other portion of the country and is most marked in

the principal cities of that section. New York suffers to a greater extent than any other of the large cities of the northeast with the single exception of Baltimore, which shows a loss of 32 per cent. over the figures for October, 1912. New York shows a loss of 29 per cent., with a very severe decline in the Borough of Manhattan, where the total of the improvements for which building permits were issued during the month reached a trifle less than \$3,000,000, which is the poorest showing of any month during 1913. Boston responds to the call with a loss of 21 per cent. Philadelphia follows closely upon the heels of New York with a loss of 25 per cent. Buffalo loses 16 and Rochester 19 per cent., while Pittsburgh turns the scale in the other direction with the substantial increase of 70 per cent. and Albany with a gain of 113 per cent. Newark loses 12 per cent. and Washington, D. C., 17.

In view of the losses in most of the larger cities, very notable increases are shown in the case of Hartford, Conn., with an increase of 43 per cent.; Utica, N. Y., 154 per cent.; New Bedford, Mass., 128; and Portland, Me., 87. The smaller cities of this section show large losses.

NORTHEASTERN CITIES

Cities	No. of Bldgs.	1913 Estimated Cost	No. of Bldgs.	1912 Estimated Cost
New York	442	\$6,457,320	449	\$9,061,521
Boston	442	4,583,000	449	5,797,000
Philadelphia	1294	2,716,850	1406	3,644,225
Pittsburgh	294	1,362,387	359	797,999
Buffalo, N. Y.	419	1,347,000	481	1,616,000
Albany, N. Y.	261	781,965	283	365,575
Rochester, N. Y.	314	735,403	373	915,121
Baltimore	287	697,606	252	1,019,554
Newark	217	675,530	262	773,748
Washington, D. C.	381	660,932	558	803,123
Hartford	131	608,505	107	422,865
Worcester, Mass.	131	494,044	148	739,509
Utica, N. Y.	167	457,702	73	180,122
New Bedford, Mass.	117	388,000	97	170,000
Springfield, Mass.	108	327,498	122	434,995
Portland, Me.	30	258,164	47	137,965
Brockton, Mass.	44	223,435	62	179,265
New Haven	97	214,785	123	399,465
Wilkes-Barre	55	206,687	71	281,104
Elizabeth, N. J.	62	180,405	60	165,339
Eric, Pa.	84	179,813	144	348,873
Paterson, N. J.	53	172,605	88	159,587
Harrisburg	37	153,610	32	51,175
Somerville, Mass.	29	132,660	33	193,350
Trenton	83	127,921	121	178,234
Wilmington	64	123,902	53	189,207
Reading, Pa.	35	103,125	32	88,975
Scranton	38	102,251	69	126,216
Allentown, Pa.	40	79,900	41	561,550
Syracuse	41	78,985	110	390,778

Chicago leads all the cities of the United States in the value of building permits issued during October, 1913, recording a gain of 6 per cent. over the corresponding figures of October, 1912, and most of the other cities of the north central portion of the country fall in line with this lead, the most notable exception being that of St. Louis, which suffers a loss of 43 per cent. St. Paul loses 7 per cent. and Cincinnati 27. The poor showing of the latter city is said to be due largely to the tightening of the money market. The same condition prevailed in Indianapolis, which records a loss of 24 per cent. Akron loses 5 per cent. Detroit records a substantial gain of 21 per cent. over the figures of October of last year. How many of the other cities contrasted with a year ago may be seen from the following table:

NORTH CENTRAL CITIES

Cities	No. of Bldgs.	1913 Estimated Cost	No. of Bldgs.	1912 Estimated Cost
Chicago	1020	\$9,314,000	1178	\$8,745,600
Detroit	809	3,079,540	846	2,544,005
Cleveland	1034	1,979,075	954	1,916,260
Kansas City, Mo.	317	1,540,705	416	893,335
Minneapolis	551	1,240,950	514	1,117,380
Milwaukee	350	1,210,123	423	1,189,766
Toledo	257	868,165	215	404,553
St. Louis	736	820,073	800	1,454,125
St. Paul	387	804,252	309	869,946
Columbus	271	590,005	264	341,983
Cincinnati	1097	581,345	1250	798,625
Indianapolis	454	573,048	444	757,445
Akron	270	463,425	238	490,845
Sioux City, Ia.	70	360,662	50	156,965
Omaha	91	297,025	109	225,365
Peoria	57	291,909	42	151,875
Grand Rapids, Mich.	165	257,863	126	218,092
Dayton	75	252,225	70	196,550
Duluth	142	212,452	106	178,785
Youngstown	75	207,680	112	246,730
Ft. Wayne, Ind.	59	155,385	69	227,415
Davenport	49	149,900	35	88,100
Evansville	110	137,286	126	229,925
Springfield, Ill.	35	110,015	32	78,815
St. Joseph, Mo.	56	61,128	77	112,325

Only four of the principal cities of the southern section of the country showed gains over the corresponding month of last year. Dallas, Texas, gained 81 per cent. and Chattanooga, Tenn., 54, while New Orleans recorded a gain of 11 per cent. over the figures of 1912, and Nashville of 12 per cent. The other cities of the South showed decreases, the greatest percentage of loss being in the case of Richmond, Va., with 88 per cent., followed by Atlanta, Ga., with 83 per cent., Norfolk, Va., 78, and Memphis, Tenn., 74 per cent. Louisville, Ky., lost 25 per cent., Savannah, Ga., 11, Tampa, Fla., 42, and Charlotte, N. C., 46 per cent.

SOUTHERN CITIES

Cities	No. of Bldgs.	1913 Estimated Cost	No. of Bldgs.	1912 Estimated Cost
Dallas	159	\$519,435	137	\$274,875
Atlanta, Ga.	335	338,340	413	2,115,667
Louisville	210	332,580	252	534,010
Birmingham	368	254,741	324	252,375
New Orleans	...	208,750	...	187,632
Memphis	306	196,990	316	750,891
Richmond, Va.	87	147,060	88	426,520
Savannah, Ga.	71	129,010	77	145,150
Tampa, Fla.	136	114,163	...	199,753
Chattanooga	215	89,470	215	57,840
Norfolk	56	77,384	68	348,513
Nashville	45	72,496	50	65,518
Charlotte, N. C.	35	41,100	26	76,232

Practically the same conditions seem to prevail in the western cities of the country as those which have just been recorded in the cities of the southern portion of the United States. Four of the western cities, only, show gains, but in all of these cases the recorded increases are of a substantial character. Seattle increased 23 per cent. over the figures of October, 1912, while San Antonio, Tex., records a gain of 24 per cent., and Stockton, Cal., 30 per cent.

EXTREME WESTERN CITIES

Cities	No. of Bldgs.	1913 Estimated Cost	No. of Bldgs.	1912 Estimated Cost
Los Angeles	1460	\$1,701,550	1646	\$2,677,780
San Francisco	552	1,118,280	562	1,722,860
Oakland, Cal.	348	777,387	465	836,169
Portland, Ore.	631	681,710	627	1,026,885
San Diego	292	563,779	477	884,319
Seattle	831	474,190	799	374,045
San Antonio	290	275,405	358	221,245
Sacramento	137	236,245	94	385,378
Salt Lake City	73	171,795	57	209,476
Berkeley, Cal.	109	158,050	105	222,950
Spokane	78	140,340	109	145,330
Pasadena	168	133,920	148	198,024
Stockton, Cal.	52	108,668	32	75,275
San José	55	60,027	61	104,075
Pueblo	17	44,889	20	38,518
Colorado Springs	35	20,750	28	129,861

All of the other cities of the West show decreases from 85 per cent., in the case of Colorado Springs, to 3 per cent. in the case of Spokane, Wash. Los Angeles lost 43 per cent. and its rival, San Francisco, 34 per cent. Oakland, across the bay, lost 7 per cent. Portland, Ore., dropped to but 33 per cent. of the figures of the corresponding month of last year, and San Diego lost 36 per cent., while Sacramento, Cal., lost 41 per cent.

BUILDERS' APPLIANCES AND EQUIPMENT

Some Things of Seasonable Interest to Those Having
to Do with the Building Business

Mogul Steel Frame Power Grindstone

In the construction of the Mogul steel frame power grindstone, illustrated in Fig. 1 and made by the Richards-Wilcox Mfg. Company, Aurora, Ill., are embodied several features of interest. The frame is of heavy steel angle iron, rigidly braced, instead of ordinary cast iron, which prevents the likelihood of breakage, either in transit or actual use. The stone is mounted on ball bearing journals which are dust and grit proof. It is equipped with a heavy, one-piece gray iron water pan, from which the water can be drained by the plug provided for this purpose at the



Fig. 1—Mogul Steel Frame Power Grindstone

bottom. This overcomes the necessity of removing the water pan to drain off the water and is a valuable feature, saving both time and trouble. It is necessary to drain off the water when the stone is not in use, because if the stone is allowed to stand in water for an extended length of time, the submerged part becomes soft and will wear away more rapidly, which throws the stone out of true and prevents efficient grinding.

The stone is of the best quality Berea grit, sizes 22-24 in. in diameter and from 3 to 3½ in. thick. The pulleys are 6 in. in diameter with 3 in. face. There is an adjustable tool rest with drip tray draining into the water pan.

This grindstone may be furnished with foot pedal when desired, and a hand crank is furnished with every stone. It weighs complete 200 lbs.

Veribest Asphalt Shingles

What is referred to as the up-to-date shingle of the century is the "Veribest" turned out by the McHenry-Millhouse Mfg. Company, South Bend, Ind. These shingles are cut 8 in. wide, 12¾ in. long and in laying only 4 in. of the length are exposed to the weather. Consequently when the roof is covered the shingles form three thicknesses of waterproof material and four thicknesses where nailed. The shingles are especially adapted for all classes of residences or public buildings where wood, slate or tile shingles might ordinarily be used. The claim is made that the "Veribest" asphalt shingles give a building an attractive appearance, require no painting, and will last an indefinite number of years. Their colors are said to be fadeless; they are fire-resisting; save insurance; render the house warmer, and will neither warp nor curl. The claim is made that it is possible with these shingles to obtain the decorative effect of red, gray or green slate, and at the same time avoid the danger of cracking. The

shingles are packed one-quarter square to the case, which weighs when full 50 lb. The shingles are uniform in size and thickness, and can be laid, it is claimed, cheaper and quicker than wood shingles. A folder which the company has issued carries illustrated directions for laying these asphalt shingles.

The "Stay-Locked" Porch Column

To do a thing so well that subsequent generations do not improve upon it is a great distinction either for a people or for an individual. The Greek, Doric, Ionic and Corinthian columns were not the first column designs which civilization produced, but the work was done so well that most of that which preceded it has been forgotten and the Greek designs have not been superseded. The truth of this statement is very clearly shown in a recent booklet issued by the American Column Co., Battle Creek, Mich., which contains a large number of half tone cuts, illustrating residences in which column designs of various kinds have been used to advantage. One of the most unusual of these types is the so-called pergola entrance, in which twin groups of fluted Doric columns support projecting rafters, the other ends of which are supported by square pilasters of similar design. These rafters in turn support the members upon which the flat roof of the entrance way is laid. All of the columns shown are of the "Stay-Locked" column system manufactured by this company.

How To Build

A most interesting little pamphlet which is being sent out by the Arkansas Soft Pine Bureau, 308 South Canal street, Chicago, Ill., contains a lot of valuable information bearing upon the construction of buildings of various kinds. Reasons are presented why Arkansas soft pine should be used for the purpose, its advantages being set forth in a way to command the attention not only of the architect but of the builder. Illustrations are given showing how to construct various styles of sills; how to brace the corners of the frame of a building; how to apply lath, plaster, sheathing boards, building paper and siding, as well as how to construct home-made columns. We understand that a copy of this pamphlet will be sent to any reader of the paper who may make application for it.

The "Insto" Electric Bath Heater

The Insto Electric Heater Company, Cincinnati, Ohio, has placed on the market a practical bath heater, illustrated in Fig. 2, and which the company claims heats 15 gallons

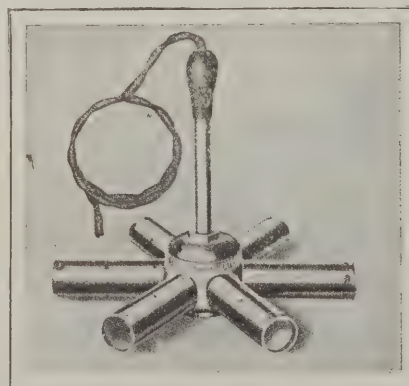


Fig. 2—"Insto" Electric Bath Heater

in 15 minutes. The bath heater is simply constructed, and all one has to do is to place the heater in the water to be heated. The company states that the rapidity with which the water is heated is because of the circulating feature,

which is the outer casing that contains 18 holes and each one of the six units that is covered by a sleeve. The water passing up between the two sleeves gives boiling water immediately and circulates out through the holes in the outer casing. Unless the user is careless, a burn-out is impossible, the company claims, as wires are not imbedded in solid material. There are two air flues, one around the heater on the inside and one in the center of the heater on the inside which cannot be seen. The heater coming in direct contact with the water makes it impossible for any heat to be wasted.

The outer sleeve can be easily removed, preventing the clogging of the heater. The "Insto" heater is small, nickel-plated and furnished with cord, ready to attach to any wall plate or knife-switch.

The "Kno-Equal" Corner Beads

Among the latest candidates for popular favor in the way of corner beads are the devices here illustrated and which have been placed upon the market under the name "Kno-Equal" by the North Western Expanded Metal Company, 904 Old Colony Building, Chicago, Ill. In Fig. 1 is shown the Kno-Equal corner bead intended for use with or



The "Kno-Equal" Corner Beads—Fig. 3—Corner Bead Intended for Use With or Without Clips

without clips. Its particular feature is the stiffening flanges on the two lower edges. These have a three-fold purpose—they stiffen the edges of the bead and make it more rigid; they make an additional bond for the plaster, and they act as a clinch for the saddle clip when it is necessary to use this type of bead on work having grounds deeper than the usual work or when the bead is used on brick walls. This bead is made from No. 24 gauge steel and is galvanized after cutting and forming. It is furnished

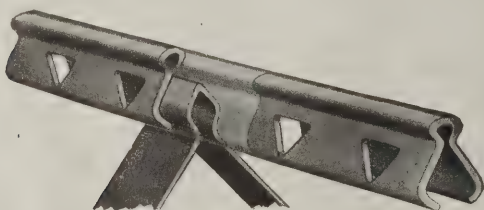


Fig. 4—Corner Bead for Use on Work Having Deep Grounds

in lengths of 6, 7, 8, 9 and 10 ft. The heavy double galvanizing is said to insure the bead against rust. In Fig. 2 is shown a corner bead intended for use on work having extremely deep grounds. It is a very rigid bead owing to its channel shape. The diamond-shaped openings furnish a perfect key for the entire length of the corner. The metal is heaviest at the point where it will prove most effective and the clips allow the use of this bead in connection with any depth of grounds. The clips are adjustable and can be placed at any point desired. In Fig. 3 is shown the Kno-Equal corner bead for use on brick, stone or tile walls. This bead is somewhat similar to that shown in Fig. 2, but is more nearly a perfect channel shape. Here,



Fig. 5—Corner Bead for Use on Brick, Stone or Tile Walls

as in the other case, the steel is concentrated at the point where it will most effectively protect the corner, and as a result there is no waste material. The use of the clips allows these beads to be quickly and easily erected on any kind of a corner to conform with any depth of grounds. The clip used in connection with this bead is known as No. 2, and when spread to the angle of the corner the clip grasps the bead and holds it rigidly in place. The advantage of using a bead with a clip is said to lie in the ease with

which the bead can be adjusted to any desired distance from the corner to agree with any depth of grounds or to provide for inequalities in the wall surface, such as are often found in masonry walls.

In Fig. 4 is shown a cross section of a plastered corner in connection with which the Kno-Equal bead is used with the

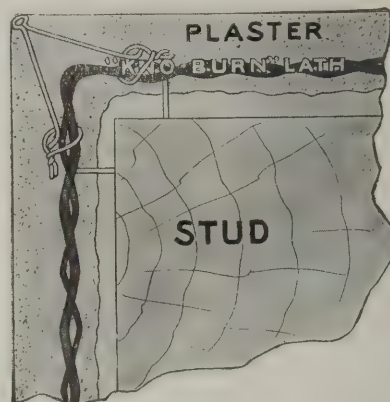


Fig. 6—Section of Corner Showing Use of Bead and Metal Lath

company's Kno-Burn metal lath. The company has issued a very interesting pamphlet relating to the Kno-Equal corner beads, the numerous illustrations showing various applications and giving directions which cannot fail to be appreciated by the builder and contractor.

Brains Essential to Success in Building Work

Every one who has given the matter the slightest consideration knows that in order to succeed in the building business or in fact in any line of industry there must be a thorough familiarity with all the various details as well as a general acquaintance at least with other branches which are closely allied to it. The young builder and contractor who starts out to make a place for himself in his chosen calling does so with the idea that he must give to his work the very best that is within him—he must be progressive, alert to his opportunities, and apply his gray matter in a way to spell "success," whatever obstacles may beset him; in other words, he must use his brains, for he who works without them is a useless member of industrial society. The builder must not only understand perfectly how to plan the position of all materials entering into the construction of a building long before they may be delivered to him, but he must also be able to know almost at a glance whether or not the work of erection is being properly performed by the mechanics under his charge. All this involves among other things the ability to read architects' drawings or blue prints with facility. He must be able to do this in order to submit bids on the contracts that are offered for estimates, and however



Fig. 7—Administration Building of the American School of Correspondence at Chicago, Ill.

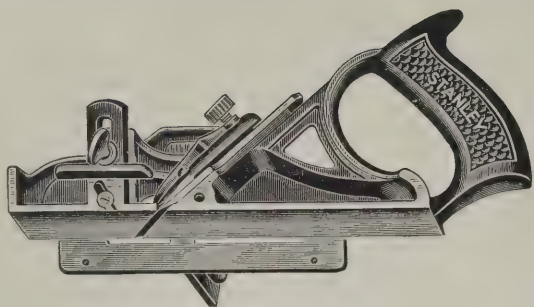
trustworthy his subordinates he will discover that it is money in his pocket to understand himself the meaning of every line and figure. More than this, he will find it of additional value to be able to understand at least in a general way how these final plans were evolved, and this requires something more than the mere ability to read architects' drawings—it means the ability to draw the plans themselves.

The young man just entering the building business is even more dependent for success upon his ability to thoroughly understand blue prints or architects' drawings and read them at a glance. Builders have a written language of their own in which lines and curves represent materials and details of construction, letters and figures replacing pages of printed instructions, while words are used chiefly for titles and architects' signatures. This language can be mastered only through study and practice.

While it is true that experience is a good teacher, it is

(Continued on page 46)

Stanley Tools



No. 289

Stanley Skew Cutter Filletster and Rabbet Plane

¶ A Plane that is fast finding its way into the "kit" of every lover of good tools.

¶ It has an extra wide cutter (1 $\frac{3}{4}$ inches) which is set on a **Skew**.

¶ It is provided with a **Fence** and a **Depth Gauge** which can be attached to either side, so that the Plane can be used equally well for right or left hand work.

¶ Furthermore, the **Fence** is so hung that it slides under the bottom, enabling the user to regulate the width of the cut.

¶ It has two adjustable spurs, one on each side, a valuable feature. By removing the **Fence** and **Arm** a very superior **Rabbet Plane** is obtained.

8 $\frac{1}{2}$ in. long. Weighs 3 $\frac{3}{4}$ lbs.
List Price, \$1.75

Ask your Hardware Dealer to let you see it, or send to us for Catalogue No. 34-E, which contains complete description of this and other special planes.

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THE composition of roofing may be a dry subject to look into—but that's the safest way to insure a dry building ever afterward.

Ordinary "composition" or "secret process" roofings are variously made—some of coal tar, some California and Texas "asphalts" (so called), and some of stearin pitch. These are *manufactured* products. They lack uniformity, and are utterly devoid of lasting natural oils to prevent their cracking.

Genasco Roofing is made of the natural product of Trinidad Lake, which wells up from the heart of Nature full of storm-defying, weather-resisting, lasting oils which only Nature can produce.

This is the real and vital *inside* difference, even though the surface of roofings may look alike.

Be on the safe side—use Genasco, the roofing with the hemisphere trademark.

Smooth or mineral surface—several weights. Guaranteed. Every roll of Genasco smooth surface roofing contains the patented **Kant-leak Kleet**, which waterproofs seams without cement, and prevents nail-leaks. Write us for samples of Genasco, and the Good Roof Guide Book, free.

The Barber Asphalt Paving Company

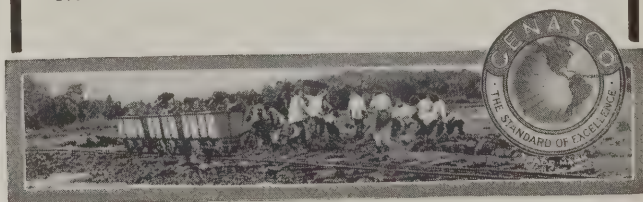
Largest producers in the world of asphalt and ready roofing.

Philadelphia

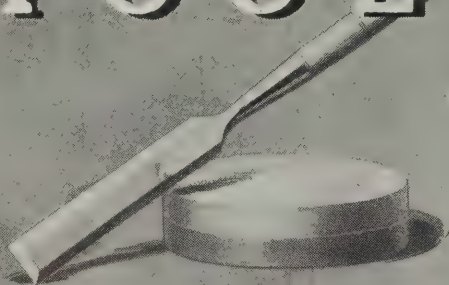
New York

San Francisco

Chicago

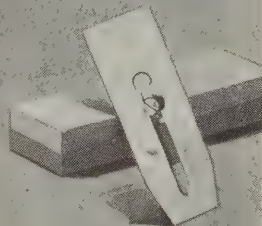


SHARP TOOLS



TOOLS with the keen, smooth edge that will stay sharp on the job are found in the tool kits with

Carborundum Sharpening Stones

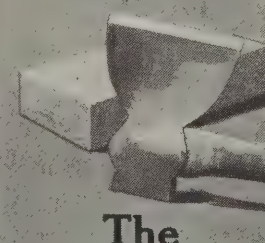


Just a few strokes and the edge is there, keen and smooth.

A Carborundum stone cuts—cuts clean, there is no rubbing—it gives an edge that is an edge—every stone is uniform and it won't fill or glaze.

There is a Carborundum stone for every edge tool.

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generally accepted in the skilled trades that systematic study under competent instruction will enable a man to considerably shorten the time formerly required to master a trade. This fact, however, in no wise lessens the value of experience, but on the contrary enhances its value, because it enables the man to secure by study the fundamentals of his trade and thus to devote all his working time to learning those things which experience only can teach. It is a recognition of this truth that has brought about the teaching of the manual arts by trade schools and correspondence institutions.

One of the oldest of these is the American School of Correspondence at Chicago, Ill., which was founded in Boston in 1897 and removed to Chicago in 1902, where it became associated with the Armour Institute of Technology and for five years it conducted its work in cooperation with it. In 1907 it erected, at 58th and Drexel streets, its present administration building, especially designed for correspondence work. A general view of this structure presented in Fig. 7, shows it to be a five-story building and about twice the size of the average high school building which it somewhat resembles, but it holds no students, as the space is occupied by officers and instructors and by the many persons required to carry on the affairs of the school. The American School of Correspondence is based upon the principle that every man is entitled to a good education and that if he cannot go to school the school should come to him. It encourages every man to make the most of his opportunities by improving his spare time and shows him in a practical way how to do it. It has made correspondence study so practical that its students graduate from their studies into well-paid positions and has put its course within the reach of any man who possesses ambition and the will to work.

The School considers of special importance its work in drawing and design because it fully appreciates the fact that a knowledge of drawing in all its branches is absolutely necessary to the man who would succeed in building work. The School uses its own special textbooks, written especially for its use, and its own tried and improved methods of instruction, and the results for the students show that it is working along the right line. Just at present the School is making a special offer by which the student obtains a free reference library on drawing and a free drafting outfit complete if he enrolls for the regular course.

The Yankee Compound Level

Surveying instruments are necessarily expensive and the selection of equipment for surveying purposes should always be based on the degree of accuracy to be attained in the data secured. In many of the operations connected with building work, levels must be struck and horizontal and vertical angles determined in which the degree of accuracy required will not always warrant the purchase of an expensive transit or level. The Yankee compound level, manufactured by the Frost-Adams Co. 37 Cornhill, Boston, Mass., is designed to meet the demand for an instrument where speed and ease of manipulation rather than great precision are the requirements. This instrument is provided with a 10-in. erecting telescope of 12 diameter power with ground and graduated level attached. The telescope is held by a swivel which forms the horizontal axis around which the vertical arc of $1\frac{1}{2}$ in. radius revolves. This arc is divided into single degrees and read by an index line placed on the standard. A rigid double standard carries the upper element and between this and the vertical center, a $\frac{3}{8}$ in. diameter plate is held, upon which the vernier is engraved, giving a reading of 5 minutes on horizontal angles. The horizontal circle is cast as one solid piece with leveling head. Four leveling screws are provided, a shifting center, a large diameter footplate and a substantial tripodhead.

The Holland Furnace

A young woman in Dutch costume with wooden shoes and peasant cap is a talking feature of the new catalogue of the Holland Furnace Co., Holland, Mich., and, acting as advocate, she makes the claim that the Holland furnace will burn any kind and grade of fuel, including hard coal, soft coal, lignite or wood without waste of gases, without internal explosions, and without opening of the joints, and that that is one of the reasons why "Holland furnaces make warm friends." The young woman then points out the fact that the Holland grate is slightly cone shaped, a feature designed to break up clinkers and cause the fuel to roll towards the wall of the firepot where air is mixed with the gas, thus generating a greater degree of heat than would be possible to attain with a flat grate and the resulting clinkers. This grate rests on rollers, thus insuring ease of manipulation. By lifting the grate slightly and raising the foot on the side of the ashpit, the grate can

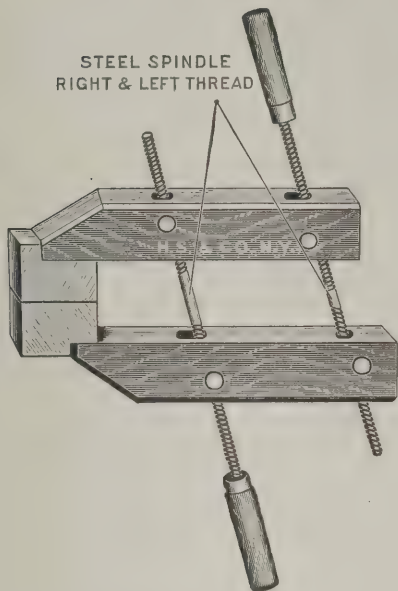
(Continued on page 48)

HERE IT IS!

AN **ADJUSTABLE** (Jorgensen Patent)

HAND SCREW

STEEL SPINDLE
RIGHT & LEFT THREAD



LOOK AT THE PICTURE!

The steel spindles work in steel sockets that permit of swivel movement while the jaws are *absolutely* rigid when tightened.

There are almost hundreds of positions possible, making the Jorgensen Screw superior to the old style by this immense advantage.

Send for Special Circular No. 3154 and be convinced

HAMMACHER, SCHLEMMER & CO.

HARDWARE, TOOLS AND SUPPLIES

New York, Since 1848

4th Ave. and 13th St.

With These Two "Yankee" Tools

(Quick Return No. 130
and Screw Holding Bit)

you can drive or draw a screw 3 feet overhead, in tight corners, or most any other out of reach place. Besides this, you get the same service as with the famous No. 30, which you doubtless now have in use. The No. 130 "Quick Return" shown here has a spring in the handle which quickly drives the spindle back for the next stroke. Add the Screw Holder to this and you see at once what a tremendous advantage you have in this tool, especially in overhead work.

It also permits you to hold the work in the one hand while you start and drive the screw in some out of reach place with the other. For all convenient and close range work this is the quickest "Yankee" Screw Driver we have yet put out.

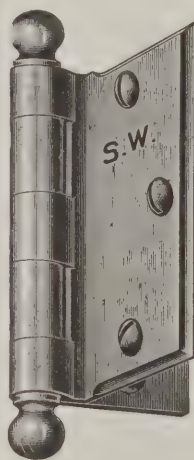
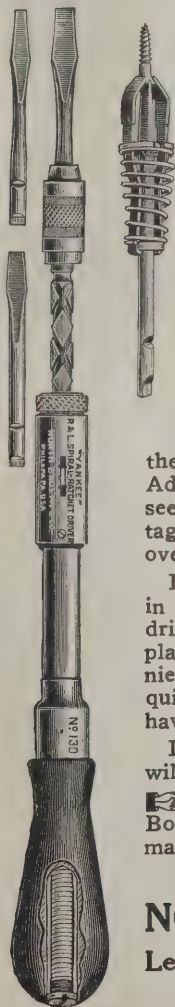
If your dealer cannot supply you, we will mail you the two for \$2.25.

Write us for the "Yankee" Tool Book. It tells about every tool we make. A postal brings it.

NORTH BROS. MFG. CO.

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Time and Labor Saved and
the Owner Satisfied

**STANLEY'S
No. 165**

Ornamental Surface Butt

BEVELED EDGE
UNEQUALED IN QUALITY

With these Butts it is not necessary to mortise the door, as the ornamental leaf screws on the surface.

The Butts can be changed to either right or left hand by simply unscrewing the slotted tip and reversing the pin. Sizes 1½ to 4½ inches.

The Guaranty



of Quality

*Write us for a Handsome Booklet of
Wrought Steel Hardware*

Department E.

THE STANLEY WORKS

NEW YORK NEW BRITAIN, CONN. CHICAGO

Black Diamond File Works

ESTABLISHED 1863

INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file
user upon application.

G. & H. Barnett Company
Philadelphia, Pa.

Owned and Operated by Nicholson File Company.

**This is
the finest
hand-
saw
made**



The Disston
Works first
made the Amer-
ican Handsaw
famous. Since then
every real improve-
ment, either in pattern
or quality, has been pro-
duced by us.

Here is the latest and finest
product of the Disston Works
—our No. D115 Handsaw.

Genuine rosewood handle, carved
and polished. The blade is Disston
Skewback design, exceptionally high
finish, made from Disston Crucible Steel
and fastened in the handle with
nickel-plated screws. Our many years'
experience and wide knowledge in the mak-
ing of a perfect saw steel has enabled us to
produce a blade for this saw that cannot be
duplicated.

The Disston No. D115 Saws can be obtained in the
regular lengths as either a Rip, Hand or Panel Saw;
are neatly packed in a handsome box, and will make a
welcome and enduring Christmas gift to the practical man.

Send for Free Book On How to File a Saw

HENRY DISSTON & SONS, Inc.
Keystone Saw, Tool, Steel and File Works
Philadelphia U. S. A.

be lowered, giving an opening of 7 in. The holding bars lock back in position by simply raising the grate with either shaker or lifter. The Holland air-admitting firepot is made in two heavy corrugated sections with a large number of funnel shaped locks cast at the lower part of the ring, thus providing for a draft from the side and consuming the soot which would otherwise clog the pipes. The combustion chamber is very heavy at the top and tapers down to the bottom, a design which provides for extra radiating surface. A special feature of this chamber casting is the recess which allows for the insertion of the water coil without the necessity of holes being drilled in the casting to admit the pipes for the reduction of the effective area of the feed door by the introduction of the pipes through this member. The radiator is cast in one piece with no joints to be cemented or bolted together. It has three heating surfaces and a damper operated from the outside of the casing causes all smoke to travel the full circuit when closed, or allows for a direct draft when open. It opens and closes by lifting and lowering the weight hanging in front of the furnace. The Ottawa furnace also comes in for discussion, a type which is designed to meet the demands for a furnace with a large heating capacity at a moderate price. In this furnace the base is made in one piece; the grate is cone shaped, with roller bearing, and the firepot is in two sections, with the lower half slotted and the recess above noted is provided in the feed section for the admittance of a water coil.

The Koehring Concrete Mixer

In the selection of a concrete mixer the first consideration should be the choosing of a machine which will produce the largest quantity of mixed concrete with the least manual labor and which at the same time is simple in construction, economical in use of power and so dependably built that it possesses the longest life with the least cost for repairs. The Koehring Machine Co., Milwaukee, Wis., makers of the concrete mixer illustrated in Fig. 8, claim that it fulfills the requirements mentioned. It is mounted on a truck with gasoline engine, side loader and water measuring tank. The cut shows the charging

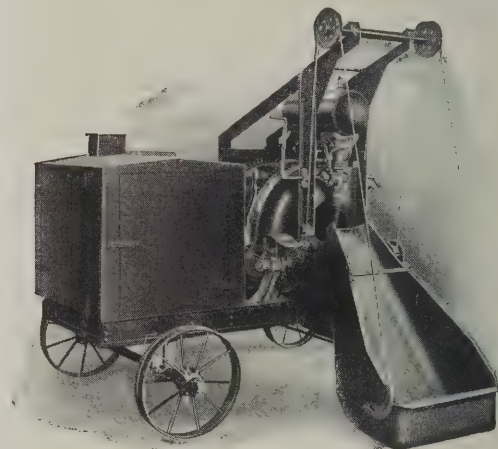


Fig. 8—General View of Koehring Concrete Mixer

side of the machine and the mechanism for operating the side loaders. The mechanism is supported on a steel frame of rigid construction. The drum is cylindrical in form with heavy slightly rounded cast heads. Near the longitudinal center of the interior periphery of the drum is an angular row of low flat buckets, alternating with long, slightly-rounded diagonal mixing blades, which are arranged to carry the material alternately to each end of the drum, and the inner end of the discharge chute when in mixing position extends a considerable distance into the drum and slopes downward. In mixing by the rotation of the drum the buckets cut through the contained material at the bottom and carry portions of it up and pour it from the sides. The mixing blades also cut through at the bottom and carry material up and discharge it alternately from end to end, breaking it over against the heavy heads of the drum. There are three independent mixing actions, constant and opposed to one another, producing a continuous intermingling of all material. The drum does not tilt to discharge. A double gear drive is used so that in the case of stripping of threads through accident to either gear, the remaining gear is strong enough to operate the mixer. The discharge chute is made in two pieces—the outer end being stationary and the inner one, pivotal, thus affording clearance for wheelbarrows. The trunnion rollers are keyed to the shaft in a manner similar to that of a railroad truck, the two rol-

(Continued on page 50)

Wodwalboard



Send for a Sample of this Modern Building Board—show it to prospective home builders—tell them how it replaces lath and plaster—makes wall paper unnecessary—costs less than lath and plaster—can be used for both old and new buildings. You nail it right over studding—easy to cut—clean to handle—saves fully one-half of building expense.

Carpenters and Builders in many cities are securing good contracts for it. We sell it to you at a low price—you make a good profit on both *sale* and *erection*.

Very popular for Garages—makes a building warm in Winter—cool in Summer. You can apply it at any season—no waiting for walls to dry. Can be decorated in various effects. Can't chip, crack, or deteriorate with age. Unequalled for Bungalows. Everybody likes it.

We are also the Manufacturers of "The Veribest" Asphalt Shingles which are easy to apply, never warp and never leak. Send for our Free Catalogue and Trade Prices.

McHenry-Millhouse Mfg. Co., South Bend, Ind.

Factories at South Bend, Ind.; Pittsburgh, Pa.

Hurry Up! Get Yours!

I've got a Monarch Patent Cornice Mould all packed and ready to send to you by parcel post as soon as you send me your address.

I know you'd like to decorate your own parlor or dining room with a nice, fancy plaster cornice. Or, perhaps, you'd like to do an extra nice job in some house you are building now. Here's your chance. It won't cost you anything. I'm going to send you this tool just to show you what a good one it is.



DON'T SPEND A CENT

I'll send you the Monarch Cornice Mould on **Ten Days' Free Trial**. You don't have to buy it, but I want you to try it. Use it all you want to. If you'd like to buy it, I'll sell it to you, but I want you to test it first and prove to your own satisfaction that you won't be throwing good money away if you buy a Cornice Mould.

THE MONARCH PATENT CORNICE MOULD

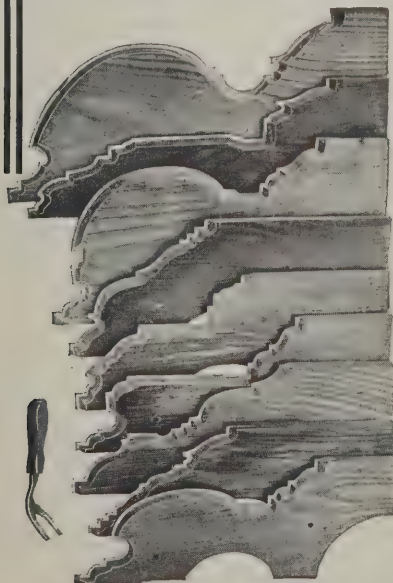
consists of an aluminum frame fitted with the best red birch guides and black cherry handles. It is light and strong. Ten assorted blades and a blade scraper complete the set. Each blade is made of white pine. The edge is of zinc encased in the wood. The pine is specially treated so plaster or water will not affect it. This tool will make straight cornices and perfect corners quicker, easier and better than you have ever seen it done. The saving in time is wonderful and the work beyond comparison. It requires no special skill to use this Cornice Mould. You can handle it as well as I can.

DON'T SEND ANY MONEY

Just send me your name and address. Tell me you want the Monarch Cornice Mould on **Ten Days' Free Trial**. Use it ten days and if it don't please you, send it back, that's all.

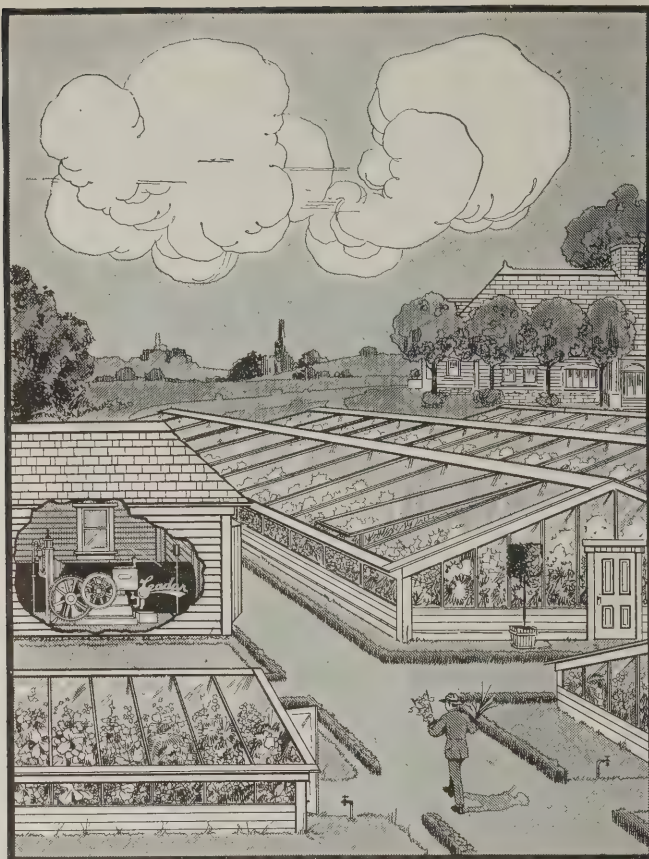
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TIMOTHY F. HORAN, 10 Maple St., COOPERSTOWN, N. Y.



Complete Set Consists of
Blade Holder, 10 Blades and
Blade Scraper

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Above illustration taken from front cover of the "Leaderite," November issue, published monthly by the Leader Iron Works.

GREEN HOUSE WATER SUPPLY

¶ There has never been a time when the market called so continuously for green food products as today, making improved methods in the greenhouse industry a necessity. The majority of these places are outside the city water supply, therefore they must have a dependable, fairly good-sized, private water plant.

¶ You will find this trade interested and ever ready to talk "Water Supply," because it is necessary in their business. They must have water the coldest day in winter as well as the hottest day in summer, and the possibility of an overhead tank freezing in winter, thus cutting off their water supply, is to them, an item of vital importance.

¶ Leader Water Supplies are particularly adapted to greenhouses. The Leader organization has made a thorough study of this particular field and has devoted time and money to determine the requirements of greenhouse operation. This information is now at your disposal. Get in touch with your local florists, spend an hour or so with each of them, find out their difficulties, then write particulars to the nearest Leader office.

¶ Have you on file the latest Leader literature, Water Supply Catalog F-1913, "The Question of Water" and Leader Gasoline Engine Catalog A?

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"Our mark of gold is a symbol of everlasting value"

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lers on each side of the drum being carried on a single shaft which makes the shaft rotate with the rollers. Attention is called to the fact that the charging bucket is short, wide and low, which permits the use of a very compact steel hoisting frame entirely self-contained on the mixer without supporting feet and therefore facilitating the transfer of the equipment. The construction of the buckets makes possible the elevation of the bucket to an almost vertical position in the emptying of material. These machines can be provided with an extension side-loader, which permits the filling of the loading bucket when the machine is elevated above the ground. The friction clutch is of the improved toggle link type, designed to permit the replacement of parts without the dismantling of the machine or the removal of the shaft. With the Koehring Water measuring tank the necessary amount of water required for a batch can be regulated and the adjustment made without the use of a wrench.

The Koehring Line of Paving Mixers is described in a new 30-page catalogue containing a number of colored half tones showing the equipment in use.

Catalogue of Registers for Warm-Air Heating

A booklet on registers for warm-air heating, describing their construction and how they should be installed to give the best results, has been issued as catalogue No. 10 by the Symonds Register Co., St. Louis, Mo. The catalogue illustrates the several designs made by the company and emphasizes the merits of its constructions. One of the features pointed out especially is the deflecting valve and the ease with which it may be operated. This is pointed out as a feature which appeals to the consumer especially and thus makes it an easy selling proposition. The efficiency of the register and the simplicity of construction are also given proper emphasis. One of the illustrations shows the Symonds patented hook fastening device for fastening the register to the register box. This requires no tin straps or cleats riveted on the box.

In addition to this there are several diagrams showing how registers should be installed to meet certain requirements in modern warm-air heating under different conditions and for different rooms, and combinations of registers on the first and second floors. Other hints on installing warm-air furnace heating systems are also given. This catalogue has been issued for general distribution and a copy may be had for the asking.

Sample Metal Ceilings and Shingles

The plan of sending out miniature metal shingles and metal ceiling plates has been adopted by the Wheeling Corrugating Company, Wheeling, W. Va., and during the past several days builders and sheet metal contractors throughout the country have been receiving these samples from that company. Accompanying these samples are cards which enumerate the various advantages of these particular products. For instance, with the sample ceiling plates, the card calls attention to the repressed beads and punched nail holes, and invites the recipient to try the sample panels, whereupon it will be found that they are true on all sides, perfect fitting and in true alignment and that the nail holes register perfectly at every test. Other advantages of the ceilings are also enumerated, as are the advantages of the shingles.

The "Little Wonder" Concrete Mixer

In the new catalogue of the Waterloo Cement Machinery Corp., Waterloo, Iowa, attention is called to the fact that the Little Wonder "Four" mixer is now called the Little Wonder "Five," as the capacity has been increased from 4 to 5 cu. ft. per batch. Orders received for the "Four" are filled with the "Five" machines at the same price as formerly charged for the Little Wonder "Four." The machine is a tilting drum batch mixer, especially adapted for small work and general utility purposes. It is designed for economical operation, great speed and superior quality of output. The drum is charged on one side and discharged on the other and the volume of the discharge can be controlled. The base or bowl is a heavy casting; the upper portion is heavy sheet steel. It has no movable parts and is tilted from one side to the other with little exertion. The drum revolves on ball bearings well protected from dust and all other bearings have oil cups. The machine is designed so that the contents of the mixer shall be visible while the machine is being operated, thus permitting the regulation of the quality of concrete to suit any particular kind of work. Other types of mixers are described, including the Little Wonder "Ten" and the Triumph self-loading, self-charging non-tilting batch mixer. The Polygon builders' hoist is described, which is

(Continued on page 52)

Don't Allow Over-Confidence

—To blind you to opportunity

TO BE COCK-SURE is dangerous in Modern Business Building: New things happen every day, both in manufacturing and selling and to get the advantage of same we must keep mighty watchful.

THE CONTRACTOR who allows himself to become prejudiced, over-confident or self-satisfied blinds himself to opportunity and makes it easier for his competitors to "Beat him to it."

Don't let another day pass without investigating



Metal Ceilings, Tile and Shingle Roofing

They will start you on the road to bigger business and bigger profits—we can promise you an agreeable surprise in new designs, superior quality and low prices.

Our new factory, improved machinery and original sales method tell the story.

It costs you nothing for samples and other convincing proofs—send for Catalog—a card will do.

The Canton Metal Ceiling Co.

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CANTON, OHIO

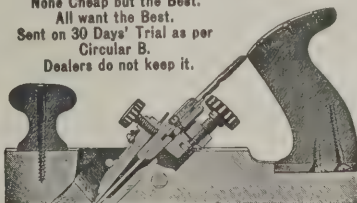
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INTRODUCTORY TRIAL OFFER

If the SELF-SETTING PLANES are not sold in your town and you write us saying "I saw your trial offer in Building Age," we will send you particulars, a carpenter's pencil and our \$1.00 Certificate, which we will receive as \$1.00 in payment for a SELF-SETTING PLANE as stated in our \$1.00 Certificate.

THE BEST IS THE CHEAPEST

None Cheap but the Best.
All want the Best.
Sent on 30 Days' Trial as per Circular B.
Dealers do not keep it.



to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained, eaty, knurley, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT. If it is not worth to YOU, OR YOUR MEN, TWICE ITS COST, return it at our expense as above stated.

If you send us the addresses of ten carpenters no matter where they live, we will send you another hard, tough carpenter's pencil.

Give the SELF-SETTING PLANE a chance to PROVE ITS WORTH. If it FAILS, return it and we will return your money. GAGE TOOL CO., Vineland, N. J.



Investigate !!!

White's Improved Level

before buying elsewhere.

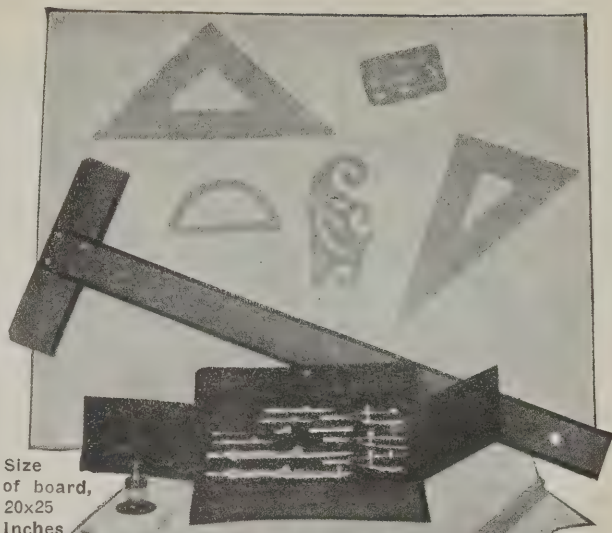
This level is especially designed to meet the contractor's every need in the level line. Over 8000 giving perfect satisfaction. Telescope long and powerful and will detect an error of 1/16" in 300 feet. Shipped on approval to your address, express charges prepaid. Write today for circular X, giving price and full information. Written guarantee with each level.

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Size of board, 20x25 Inches

FREE This \$20 Draftsman's Outfit

The complete outfit, exactly as illustrated, sent absolutely free if you enroll now. Consists of imported german silver instruments in morocco case, T-square, transparent triangles and French curve, protractor, triangular scale, ink, pencil, pencil pointer, erasers and erasing shield, drawing paper and thumbtacks. Instruments made and guaranteed by one of the largest manufacturers of mathematical instruments in the world.

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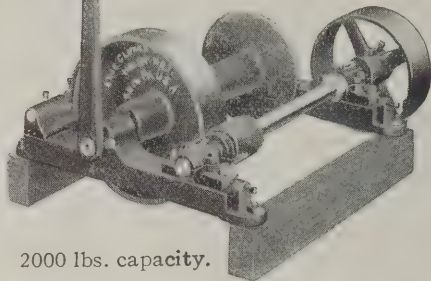
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Doubles Service—Halves Labor
At Fraction of Usual Cost.



2000 lbs. capacity.

For pulling, hauling or lifting both ways; or hauling cars back and forth.

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Knocked down, ready to erect

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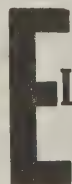
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There is money in this line, providing you satisfy your customers: The way to satisfy them is to furnish those outfits which will best fill their requirements.

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Improved Quick and Easy Rising Steam
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ELEVATORS

AND DUMB WAITERS
Automatic Hatch Gates
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Que Taliaferro, Oklahoma City, Okla.

Branch Offices, 136 Liberty St., N. Y. 108 11th St., Omaha, Neb.



Sanitary Automatic Dumbwaiter

saves carrying food to and from the cellar. Perfectly ventilated; screened openings and finished inside with durable white enamel. Keeps food perfectly. Occupies no space, as top lies flush with kitchen floor. You can walk over it. Operates simply with push button or lever. Quoted prices include the assembled waiter complete, ready to install. Price, \$17.50.

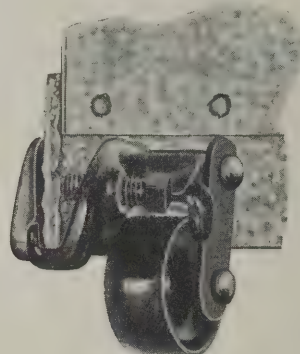
Write for Particulars and Price.

YORK AUTOMATIC DUMBWAITER WORKS
639 W. Market St. YORK, PA.

designed to combine great lifting capacity with simplicity of construction. A special feature of this machine is the interchangeable line speed by which several combinations of speed and lift can be obtained by interchange of drums and sheaves.

Rockaway Rollers for Ash Cans

One of the very necessary adjuncts of household equipment is a serviceable and especially a durable ash can of such a nature that it may be readily handled or moved



Rockaway Rollers for Ash Cans—Fig. 9—Roller Attached to Can

about. In order to make provision for this easy moving the Edwards Mfg. Company, 423 to 443 Eggleston Avenue, Cincinnati, Ohio, and with New York office at 83 Fulton street, has placed on the market what is known as the

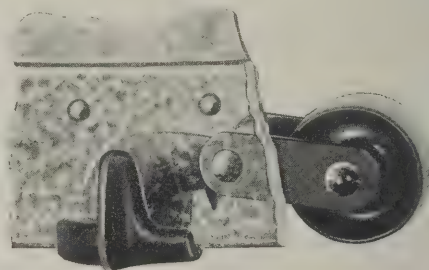


Fig. 10—Showing Roller When Can Rests on the Ground

"Rockaway Rollers" or casters, illustrations of which are presented herewith. The rollers are made to stand rough usage, are attached with malleable iron brackets, and when applied they practically turn any can into a "two-

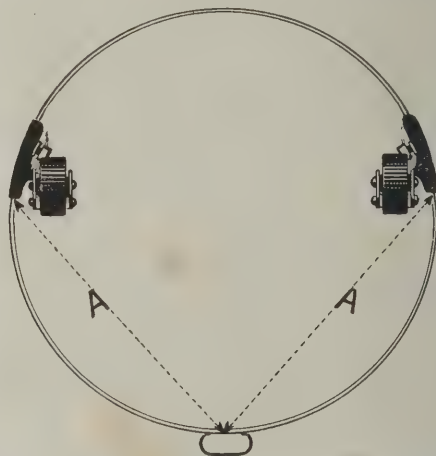
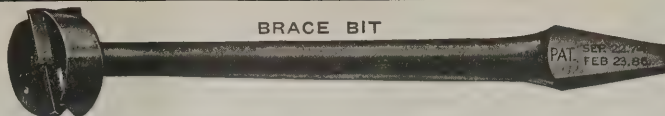


Fig. 11—View of Bottom of Can Showing Position of the Rollers

wheel" truck, and at the same time the arrangement is such that the rollers drop out of action by gravity and the can rests flat and solid. In Fig. 9 we show a roller attached to an ash can and ready to be wheeled about. Fig. 10 shows the position of the roller, when the can rests flat on the floor or ground, the wheel being invisible underneath the can. Fig. 11 is a bottom view of a can showing the position of the rollers when attached. The claim is made that the can may be turned in a circle, yet it will not slide sideways when leading it. The action of the rollers is controlled instantly by gravity, so that the largest can is as easy to handle as a small pail.

(Continued on page 54)

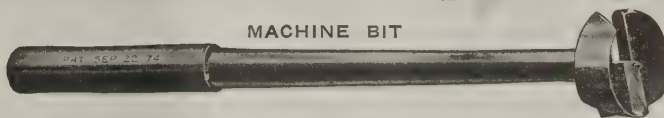


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Bores any Arc of a Circle

Is guided by its circular rim instead of its center, and can be guided in any direction, regardless of grain or knots, leaving a true polished surface. Will bore a square hole. Unequalled for core boxes, delicate patterns, veneers, screen work, scalloping, newels, ribbon moulding and mortising.

THE PROGRESSIVE MFG. CO., Dept. "A" Torrington, Conn.



MACHINE BIT



The Famous Barton Planes and Edge Tools are the ones that you ought to use. Where keen edge holding qualities are appreciated these surely will satisfy. Ask your dealer—if he hasn't them in stock or won't order—order direct from us. Ask for "The Carpenter's Catalog," and our story book "True Stories"—both free.

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THE YANKEE Compound Level

Just the thing for a Builder.
Accurate—Low Priced.

FROST-ADAMS CO.
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Send for our catalogue



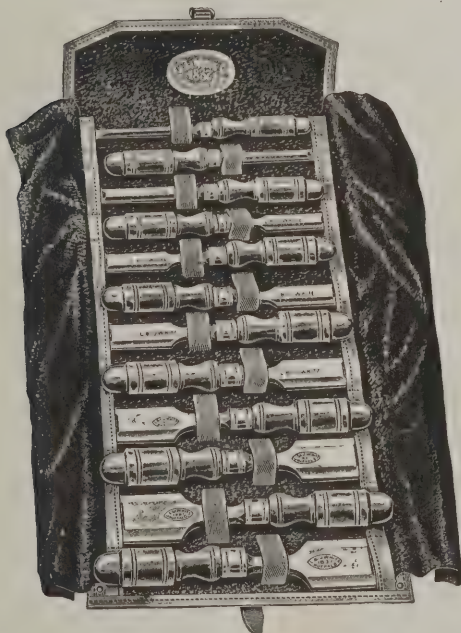
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Buck Brothers' Tools are LASTING tools—they keep their edge.

We make a full line which includes bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.

BUCK BROS., Millbury, Mass.

Set R-13



A Christmas Present

One that every good carpenter would appreciate. Tell your wife that this is the present you want and would appreciate.

These are the highest grade of chisels on the market and are guaranteed satisfactory. We wish you all a Merry Christmas.

The L. & I. J. White Co., Buffalo, N. Y.

Pearson's Automatic Shingle Nailer



Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing etc. Nails can be driven through tin or quite heavy sheet iron.

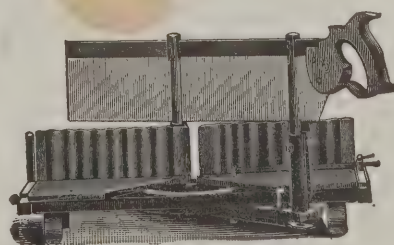
PAYS ITS COST ON ONE JOB

Made in two sizes: The BLUE Nailer for 3d common No. 14 gauge wire nails. The RED Nailer for 3d galvanized No. 13 gauge 1 1/4 inch wire nails. It will come right to your door, quick, by insured Parcel Post, all prepaid for only \$5.00 It makes good.

Pearson Mfg. Co.
Robbinsdale, Minnesota

Goodell Mitre Box

Made of STEEL—Cannot Break
First in Quality and Improvements



Automatic Stops for holding up
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Corrugated Backs
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Gauge for Duplicate
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other features.

If you want the best
you will take no
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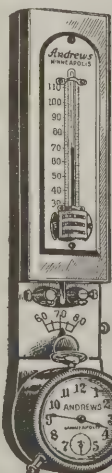
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New Building for Henry Bosch Company

A building having a frontage of 50 ft. and a depth of 70 ft. is now in course of erection at 2024 and 2026 South Wabash Avenue, Chicago, Ill., designed to meet the growing requirements of the Henry Bosch Company, manufacturers of paint and wallpaper. The building is of steel and tile construction, the front being of terra cotta and the side and rear walls of brick 12 in. in thickness. It rests on a spread foundation, the unit slab of concrete being 3 ft. thick. The foundation and superstructure have been made sufficiently strong to permit of the addition of three stories whenever the business of the company require them. The floors are of hollow tile between which and the maple finish floor is a layer of cinder concrete. The three lower stories will be completely plastered, while in the case of the four upper stories, which will be occupied by the company for additional working space to its plant, the ceilings and tile walls only will be plastered, the brick walls being left unfinished. The wood trim will be quartered oak. The building will have two electric elevators in addition to which there will be an iron stairway and an iron fire escape. There will be a sprinkler system and the heating will be by steam. The architects, Doerr Brothers, 28 East Jackson Boulevard, estimate the cost at \$100,000.

TRADE NOTES

Hartmann-Sanders Company, Elston and Webster avenues, Chicago, Ill., has just issued a new catalogue known as No. 50 containing many new and attractive designs of column openings. Any reader of *The Building Age* sufficiently interested can secure a copy of this upon application to the address given.

Oak Flooring Bureau, 895 Hammond Building, Detroit, Mich., calls attention to the fact that in times gone by a floor was simply a foundation or base on which to lay carpets, little attention being given to anything except to see that it had strength and was laid fairly even. Today it is different. The architect is compelled to use his better judgment if he would anticipate the needs of his clients and serve them in the best manner. Today of all hardwood flooring, oak commands widespread attention. Nature has given it that peculiar favor which appeals to the artistic as well as the demand for the substantial. When one wants his clients to have a durable flooring it is suggested that the specifications read either "clear" quartered white or red; plain white or red oak flooring either 3/16 or 3/8 in. thick as may be deemed best.

An instance in which roofing has outlived the usefulness of the building itself is illustrated in a leaflet just issued by F. W. Bird & Son, 110 River street, East Walpole, Mass. The case in point is that of the train shed of the old Wells street station of the Chicago & Northwestern Railroad in Chicago. This was covered with Neponset Paroid roofing at the time of the construction of the building in 1903. When the train shed was torn down in 1911, this roofing was in such good condition that the railroad officials decided to save it, and various half tone cuts are contained in the leaflet, showing the removal of this roofing and its application on the roofs of other stations along the Chicago & Northwestern lines.

One of the most interesting features of the October number of "DooR-Ways"—the house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill.—is the description of the company's branch houses and the pictures of the men connected therewith. There are five branches of the company in the United States and the information presented relating to them affords an idea of the scope of the company's business. Another matter of interest is an illustrated article dealing with the solution of garage sliding door problems, all presented in a way to appeal to the architect and builder.

The convention of fire engineers recently held at the Grand Central Palace in New York City brought out many interesting and novel ideas along fire fighting and fire prevention lines. One of the most interesting of these exhibits was the A. D. T. System, which included in its display a miniature automatic sprinkler equipment in operation, for the purpose of demonstrating the advantages of the central station system of sprinkler supervisory service. By means of this system the operators in the central office know instantly when conditions are in any way disturbed from normal, and they not only immediately telephone the owner the nature of the trouble but also send an inspector to investigate. The apparatus by means of which this becomes practicable is described in detail in an article in the October number of the Grinnell Automatic Sprinkler Bulletin, published by the General Fire Extinguisher Co.,

(Continued on page 56)

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Otis A. Smith

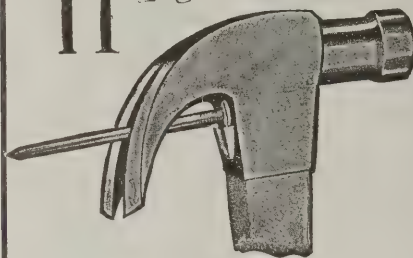
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in our Pamphlet 29; viz:
Valuable Tables for
finding size of joist, safe
load of joist, actual load
on hanger, etc., etc.

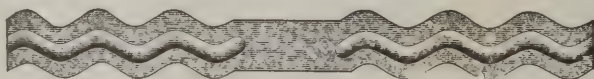
Some of these Tables
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let and to the matter on
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"The Manufacture of Electric Flat Irons" is the subject of an article in the September number of the *Abrasive Age*, in which the practice of grinding the iron is discussed and the methods shown by which the high polish is obtained. The surfacing of the top and bottom parts of the iron is done on a Besly machine with a wheel 24 in. in diameter and 4½ in. in thickness. The work is held in a special magnetic chuck and applied to the base of the grinding wheel by means of a forward lever, the same as in the previous operation. The *Abrasive Age* is the house organ of the Carborundum Co., Niagara Falls, N. Y.

A conspicuous feature of the issue of *Graphite* for October is a picture of the drivers employed by the Joseph Dixon Crucible Company, Jersey City, N. J., at their recent outing at Midland Park, S. I. The photograph was taken just before the start was made for the park and in the background may be seen three corner sections of as many Dixon factory buildings. The drivers are grouped in front of a big Dixon automobile truck lubricated with Dixon's automobile lubricants and gaily decorated and labeled. Behind it is a smaller truck ready for the trip. The day was spent in freak races and a baseball game, the latter occurring between the drivers and the Crucible factory men, resulting in a victory for the former. We understand that the reason the score was not published was because at the last moment the printer discovered he did not have the required amount of type for the column of errors.

Pullman Metal Weather Strip Company, York, Pa., is the name under which the business carried on by the Pullman Automatic Ventilator Mfg. Company will hereafter be conducted.

There is much discussion among advertising men as to the relative value of trade literature which appeals to the prospective buyer by means of a trade talk presented in story form, and that which strikes directly at the matter by a presentation of cold facts without the veneer of narrative style. The fact is that both methods are effective if the work is well done. There is no denying the attractive quality of the narrative form and a good example of this is contained in Vol. 13, No. 4 of *Ideal Ideas*, just issued by the Ideal Concrete Machinery Co., Cincinnati, Ohio, and devoted to a discussion of the Ideal type "B" batch mixer manufactured by this company. Therein the trade talk commences with a supposed conversation between two contractors, one of whom has just purchased an Ideal type "B" batch mixer, the other being an old and satisfied customer for this equipment. The secret of the effectiveness of the talk in question would seem to lie in the moderation with which the assertions are made and the realistic way in which the discussion is handled.

The American Metal Weather Strip Co. has been incorporated in Chicago, Ill., with a capitalization of \$10,000 by David B. Johnson, John T. Fellsen, Elliot and R. Goldsmith.

"Flexatite Asphalt Shingles" is the title of a booklet just issued by the Heppes Co., of Chicago, Ill., in which the process of manufacture of this roofing material is discussed. Flexatite is made from extra heavy felts, saturated with pure asphalt. It is then covered on the weather side with thick slate or granite, especially selected for the rich, natural color. This finely chipped material is imbedded in the heavy coating under great pressure and then rolled in until it becomes a part of the roofing material. This product is made in three colors, a dark red, greenish gray, and brown, all three being the natural color of the slate or granite which is used, as no artificial coloring is employed.

Universal Portland Cement Company, Chicago, Ill., has recently issued through its Information Bureau, specifications for the "Construction of Two-Course Concrete Street Pavement." The specifications contain clauses and provisions not generally included in such instruments but it is believed that such clauses are necessary and should be retained to provide for contingencies that are apt to rise in connection with work of this character.

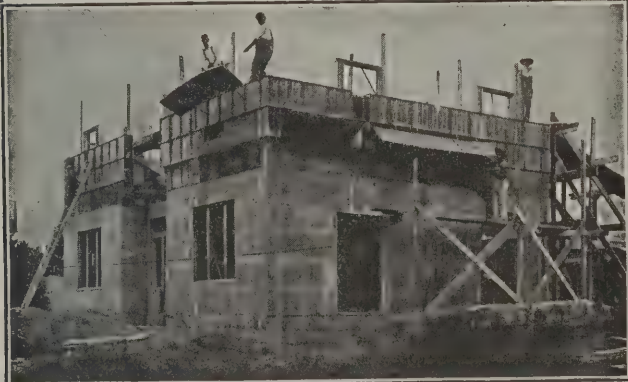
E. W. Edwards, president, the Edwards Mfg. Company, Cincinnati, Ohio, was unanimously elected president of the Cincinnati Business Men's Club at the annual meeting of the directors of that organization, held November 13. Mr. Edwards is well known to the sheet metal trade throughout the country and the products of his firm are now being shipped to all parts of the world. The company was organized in 1901 and its extensive business in metal ceilings, roofings, portable garages, etc., reflects great credit on its officers. Mr. Edwards has been a member of the Business

(Continued on page 58)

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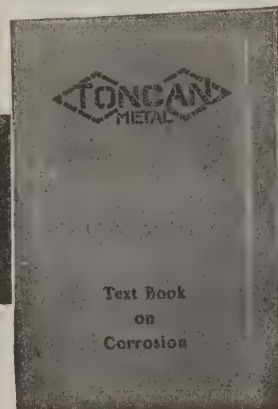
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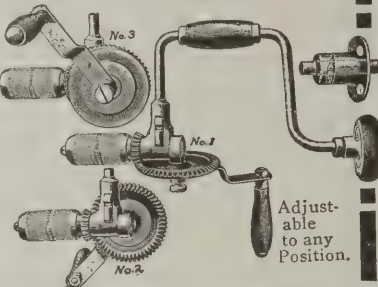
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Men's Club practically ever since its organization and has been previously proposed for president, but for business reasons he has formerly declined to accept the proffered honor.

Universal Portland Cement Company, 72 West Adams street, Chicago, Ill., has just issued an interesting pamphlet entitled "Concrete in the Barnyard," the matter having been prepared by the information bureau of the company. The topics considered are concrete floors, barnyard pavements, dairy barn and hog house floors, stock tanks, small troughs, hog wallows, manure pits and barnyard walls.

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